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The Problems of Translating Medical Terms from English into Arabic

By

Gharsa M. Argeg

A thesis submitted to the University of Durham for the Degree of Doctor of Philosophy in the School of Modern Languages and Cultures

2015

Abstract

This study tackles the problems of translating medical terms from English into Arabic a. It uses an evaluative approach to investigate and discuss the problems and intricacies of translating medical terms from English into Arabic. The purpose of the study is to display the difficulties of translating medical terms and how they were tackled by postgraduate students who are competent in medical translation and professional Arabic translators who work in the medical field. The study adopts a qualitative-quantitative approach. It focuses on different types of medical terms, excluding pharmacy-related terms. In order to find out and identify the real difficulties behind translating medical terms and how they could be approached by experienced translators, the researcher utilized a questionnaire test that included a set of English medical terms to be translated into Arabic by students who were doing a PhD in translation. The same questionnaire was also given to a group of professional Arabic translators. As medical terms are the key components of medical texts, the questionnaire included forty-five diversified English medical terms taken from different medical reports, namely National Health Service (NHS) leaflets and flyers and World Health Organization (WHO) reports for 2007 and 2008. The official Arabic translations of these documents were used to assess the translations given by the subjects in comparison to and contrast with some medical dictionaries and reliable medical websites. The population of the study included 54 postgraduate students (doing PhDs in Arabic translation) in Libyan (the researcher's origin country) and UK universities and 12 Arabic translators working in UK hospitals and clinics. The results from the data analysis showed that the translation of the medical terms posed real difficulties and challenges for the students and inexperienced professional translators although the experienced professional translators found them comparatively straightforward. Hence, the result highlights the problems of translating medical terms from English into Arabic and the importance of training to work in the medical field as a translator. Also, the study concluded that literal translation, the heavy use of transliteration, inconsistency, the students' lack of sufficient experience and practice in medical translation, and lack of up-to-date English-Arabic medical dictionaries are factors that have given rise to problems in medical translation. Also, the study showed that almost no professional translators use CAT tools or MT to help them translate the medical terms.

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Declaration

I, Gharsa Musbah Argeg, hereby confirm that the composition of this Ph.D thesis is entirely my own work.

Gharsa Musbah Argeg

Statement of Copyright

The copyright of this thesis rests with the author. No quotation from it should be published without her prior written consent and information derived from it should be acknowledged.

Gharsa Argeg

Dedication

I dedicate this study to the memory of my father ((مصباح الرقيق رحمه الله and my father in law (خليفة بن مسعود رحمه الله).

I also dedicate this study to my mother, my husband, my sisters and brothers, uncles and aunts for their great support and encouragement throughout all the years of my study. Without their support I would never have reached this stage.

For the soft part of my heart, Shaima, Shahed, Mohammed and Abdulraheem, to all people of Almshashia (the tribe that I belong to), to **Libya**, I dedicate this work.

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A special thank to the Libyan government for granting me the research scholarship and the funds, which have made this research possible.

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List of Abbreviations

CAT Computer-Assisted Translation

MT Machine Translation

NHS National Health Services

SL Source Language

SLT Source Language Text

ST Source Text

STT Scientific and Technical Translation

TL Target Language

TLT Target Language Text

TT Target Text

UMD Unified Medical Dictionary

WHO World Health Organization

Transliteration System: Arabic Symbols

The following Arabic transliteration system has been consistently employed throughout this work.

•Consonants

Arabic Letters	Transliteration	Arabic letters	Transliteration
ء	’	ض	d
ب	b	ط	t
ت	t	ظ	z
ث	th	ع	c
ج	j	غ	gh
ح	h	ف	F
خ	kh	ق	q
د	d	ك	k
ذ	dh	ل	l
ر	r	م	m
ز	z	ن	n
س	s	ه	h
ش	sh	و	w
ص	s	ي	y

2- Vowels

Arabic Letters	Transliteration
ـَfathah	a
ـِ kasrah	I
ـُ dammah	u
ا alif	ā
long yaa ي	ī
long waa و	ū
diphthong اي	ay
Diphthong او	aw

Chapter One: Introduction

Chapter One: Introduction

1.1 Introduction and Background

Translation has played a major part in communication between languages and cultures. Without translation modern technology could never have been transferred between nations. Translation can be applied to all fields of language including legal, religious, literary language etc. Among these fields is scientific and technical translation (STT), which covers the specialities which are relevant to science and technology. The act of expressing scientific concepts and content is usually challenging and serious as it requires accuracy, knowledge and understanding of the ideas behind the terms. Difficulties can arise from the fact that the language of science and technology has its own characteristic terminology. Terms are the key concept in the translation of any kind of technical text. Al-Ma'ni (2000) believes that while the understanding of the source text terminology is an important factor in the process of translating, the coining of the terms' target language counterparts is of equal, if not, greater importance. In translating technical terms, one is often faced with the problem of neologism and non-equivalence. Such problems arise due to the rapid progress of, and the advances made in, science and technology around the world which make it difficult for terminologists and specialists to keep pace with the huge numbers of terms that continually enter the language of science, which is usually English.

One of the most noteworthy issues in scientific translation is how to achieve the highest degree of precision possible in the use of words and to transfer the information contained in the source language text (SLT) into the target language text (TLT) without any loss of the original meaning.

Translation has often been viewed as the process of establishing equivalence between the source language (SL) and the target language (TL). Finding equivalents is the most problematic stage of translation, as equivalence (which means sameness or similarity) has been/is a key concept in translation studies. Achieving perfect equivalence in rendering ST properties into TT ones is not possible as each language has its own grammatical, lexical and textual systems which distinguish one from the other.

Scientific and technical translation is very important in its effects on people's lives. Therefore, a technical translator is required to have special expertise in the relevant field in addition to his or her general language capability. A translator's failure to achieve an appropriate equivalent translation will result in an incorrect translation which may be misleading in most fields but can have very serious consequences in the field of medicine.

The common use of English language in science in general, and in medicine in particular, makes the use of other languages very limited. Krulj et al. (2011:170) emphasis that "*It is well known that English is the leading language of medical sciences. Communication in English has been indispensable throughout the history of medicine*". For instance, the use of English in higher education in most Arab countries (except Tunisia, Morocco, Algeria, Lebanon and Syria) as the medium of instruction and communication is well documented. Khashīm(2006), for example, notes that although Arabic is the official language in all Arab countries, English is still used as the language of teaching in most Arab medical universities except Syria and some Arab countries in North Africa. Thus, English terminology is used academically and its use is crucial. Hence, there is a great demand for the study of scientific and technical translation from English into Arabic and vice versa. Such a demand is included in the national strategies of Arab academies in order to solve the problems of accessing scientific and technological information by the production of pamphlets and dictionaries.

Marchuk (1984) remarks that the increasing demand for technical and scientific translation arises from scientific and technical progress, the growth of scientific, technical, commercial, cultural and other relations, and the desire of nations and governments to develop co-operation and to coordinate their efforts in promoting civilization. Medical translation is a branch of scientific and technical translation and is a very important type of translation. Montalt (2011) emphasises that medical translation is one of the most active types of professional translation.

The researcher suggests that medical terms are the main challenge for a translator of medical texts. Therefore, a translator should be aware of the importance of understanding the medical terms he/she comes across during the translation process in both languages and should also be aware of the sensitivity of the subject matter.

1.2 Motives Behind Studying Medical Terms

One of the main motivations for studying medical terms is that medical terms are intrinsically interesting as they represent the key concepts within medical texts.

Most doctors and specialists working in the Arab world, including Arabs, use English when writing medical texts or reports, even for prescriptions. Khashīm (2006) argues that Arab doctors in most Arab countries such as Libya, Egypt, Iraq, and all Arab Gulf countries use English when they write reports and prescriptions because they have been educated in English. The fact that all reports that have been collected from patients in Libya by the researcher are written in English tends to confirm this assertion. So it is important for Arabic translators to be an effective link between doctors and readers and patients. In this regard, this research emphasises the importance of the knowledge of the subject matter of the texts.

Furthermore, the rigorous research that has been undertaken by the researcher herself (including in the British Library, the Tripoli Academy Library and the Benghazi Academy Library) has shown that only little research has been undertaken into Arabic medical translation in general. Therefore, the researcher's work covers this neglected area.

Although many English-Arabic medical dictionaries have been compiled and some technological supports (CAT (computer-assisted translation) tools) including translation memories, term bases and terminology management systems, have been developed, many medical terms still cannot be found in such dictionaries, and computer translation tools may not be helpful in many cases. That is because the terms are either new or because there are no direct equivalents for them in Arabic. Additionally, compounds and some abbreviations usually cannot be found in English-Arabic dictionaries and other translation tools. In this situation, the researcher will try to suggest some strategies to overcome the problem of new terms and non-equivalence.

Translation students and translators alike have been suffering from the problems that are faced when translating medical texts. This study aims to clarify the problems and to lay the foundation for future research in the area in question.

1.3 Statement of the Problem

Medical translation as a sensitive subject demands a high degree of consistency and accuracy in transferring the source text to the target language (TL).

The translation of medical terms generally throws up many challenges. Although some medical terms can be translated without any difficulty, others are tremendously difficult to translate. What makes the translation of some medical terms into Arabic more complicated is their complex structure, e.g. as shown in such terms as hypergammaglobulinaemia, videofluoroscopy, gasto-oesophageal etc. Additionally, there are medical compound terms

and abbreviations (that can be ambiguous) which make it hard for the untrained translator to grasp the intended interpretation, e.g. CNS: central nervous system and UTI: urinary tract infection etc. Many medical abbreviations cannot be found in bilingual dictionaries and computer translation tools.

Translators sometimes find it difficult to cope with these structures in English, which might result in mistranslations. Furthermore, there are problems of ambiguity as many English terms are either new or so technical that untrained translators cannot understand their meanings in the SL.

Having different types of equivalence and different medical Arabic terms for the same foreign English medical term might seem inevitable due to different factors. Different bodies of translation that work individually in the Arab world, and multiple codified lexical resources are considered among the major causes of the multiplicity of terms that is reflected in terminological inconsistency as a result of lack of standardisation.

All of the above emphasises the importance of training for the translators to be able to work in the medical field.

To sum up, the study will show that the translation of medical terms is problematic for two main reasons: the first reason is that some medical terms have complex structures and can give rise to various semantic, lexical and grammatical interpretations, through which the job of a translator is rendered very hard. The second reason emerges from a lack of clarity of, or because of ambiguity in, some medical terms or expressions in the SL which, in turn, has a great effect on the translation process. Often such ambiguity derives from the fact that many English medical terms have Latin or other language origins. The problem of neologism and non-equivalence also affects the translation process.

1.4 The Objectives and Hypotheses of the Study

The present study aims to examine a specific translation problem, i.e., medical terms. The study investigates the problems that Arabic translators face in rendering English medical terms into Arabic. The following are the research hypotheses:

1. Translating medical terms from English into Arabic is the main problem in translating medical texts. Therefore, the study will attempt to find out the extent to which translators are able to overcome and tackle such translation difficulties.

2. Translators need to be trained to work in the medical field before starting their job.

3. Understanding the meaning of affixes used with medical terms will help a translator to tackle the problem of translating medical terms which include affixes.

4. Neologism, non-equivalence, polysemy and terminological inconsistency pose serious translation problems; therefore the study aims to draw up some strategies to help a translator to deal with these problems.

5. The lack of updated English-Arabic medical dictionaries negatively influences the work of Arabic translators in the medical field as most of them consult such dictionaries to look for the meanings of medical terms.

The study also aims to obtain answers for the following question:

What kinds of strategies do current translators follow in order to translate complex medical terms?

1.5 Structure of the Study

This study is an attempt to investigate the scope, problems and intricacies of translating medical terms from English into Arabic, and to illustrate the importance of training in medical translation. This study focuses on different types of medical terms, namely the names of diseases, conditions, parts of the body, tests, symptoms and medical equipment. To identify the difficulties in translating such medical terms, the researcher devised a questionnaire test that included a set of medical terms to be translated into Arabic. The test included forty-five medical terms taken from different medical reports translated by professional translators in Libya, from the World Health Organization reports for 2007 and 2008 that have Arabic translated versions, and from some leaflets and flyers produced and translated by the NHS in England.

The population of the study included two samples:

Sample 1**:** Postgraduate research students in the Tripoli Academy and in Benaghazi Academy in Libya (which are the only academies in Libya that have an English-Arabic translation programme) and postgraduate students at Salford University, Durham University, Liverpool John Moores University (doing researches linked to Arabic translation), Exeter University, Manchester University and Leeds University. All of the postgraduate students who were involved in the study were doing their PhDs research about the issue of Arabic translation.

Sample 2: Professional translators who work in hospitals, GP and health centres in the UK. All are Arabic native speakers .

Based on the data analysis, certain strategies, schemata and guidelines have been drawn up to help future translators to achieve accurate and exact translations of the medical terms involved.

To achieve its objectives, this study is structured in seven chapters as follows:

Chapter one provides the introduction and sets the scene. It presents a statement of the problem, the motives behind the study, the area of investigation and the objectives and hypotheses underlying the study.

Chapter two presents an overview of the scope of scientific and technical translation. It reviews scientific and technical translation in general with regard to the problems and difficulties confronted in scientific and technical translation into Arabic. It also reviews the efforts of Arab countries to establish institutions and academies concerned with Arabic technical terminology, translation, arabization and terminological standardization. It closes with a summary.

Chapter three reviews medical term formation in both English and Arabic. It starts with an analysis of English medical terms. The derivations of English medical terms and the derivations of Arabic medical terms are included. This chapter presents some scholars' concepts concerning equivalence and medical translation and methods used in translating medical terms into Arabic. It also talks about equivalence problems in medical translation including neologisms, non-equivalents and terminological inconsistencies. Some strategies for solving them are then discussed. A short review of English-Arabic medical dictionaries and computer-aided translation tools is also presented.

Chapter four outlines the research design and describes the population and the sample of the study. It then presents the methods, procedures and steps that the researcher followed in

building the instrument of the study (the questionnaire) including the pilot study and its results and the methods followed in analysing the main data of this study.

Chapter five presents a data analysis of the main study and a discussion of the 45 medical terms. The analysis and discussion are supported by statistics presented in tables. At the end of the chapter, the types of strategies used by the subjects (students and professional translators) in translating the 45 medical terms are illustrated and discussed.

Chapter six is a short summary of the study which includes general conclusions, the findings of the study, the contributions of the study, and recommendations and implications. The chapter also includes suggested future steps and other general guidelines for translating medical terms.

Chapter Two: Scientific and Technical Translation (STT) into Arabic: its Features, Problems and Solutions

Chapter Two: Scientific and Technical Translation (STT): Its Features, Significance and Problems and solutions

2.1 Introduction

As medical translation is a branch of technical and scientific translation, this chapter attempts to review the topic of scientific and technical translation (STT) and discusses the true nature of such translation. The chapter starts with a presentation of STT. Definitions of STT given by scholars, factors involved in STT and features involved in STT are presented. Then, the chapter moves on to discuss the problems of STT into Arabic with an emphasis on language and on terminological-related problems in general. A short review of CAT tools and machine translation (MT) is presented. Finally, the chapter closes with a summary.

2.2 Scientific and Technical Translation (STT)

STT is an essential element in translation studies. Modern technology affects all aspects of life and society and all branches of science including translation. New scientific discoveries and innovations need to be spread through the world and translation plays an important role in transferring this technology. Translation has played an important role in transferring knowledge of science and technology between nations throughout history. Krien-Kuhle (2005:1) emphasises this fact by saying "*Scientific and technical translation has always played a pivotal role in disseminating knowledge. Today, the domain of science and technology is the main area of translation work*." Montgomery (2000) also believes that scientific and technical translation has always played an important role in transferring knowledge during history. In fact, modern science and technology is closely linked to translation or, indeed, started as translation. The need for translation has grown rapidly as a result of the increasing demand for the dissemination of information in the technico-scientific fields. Kingscott (2002:247) states "*it has been estimated that scientific and technical*

translation now accounts for some 90% of global translation output". Byrne (2012) emphasises the same point by saying that every aspect of our lives has been swept along by a seemingly unstoppable wave of new inventions and technological advances. These inventions and advances are accompanied at almost every step of the way by translation in its capacity as a vehicle for disseminating scientific and technical knowledge. All countries need to keep pace with new technology. Arab countries are going through a phase of modernization on a massive scale. Therefore, the translation of scientific material from English, as the language of science and technology, into Arabic is crucial.

By the word "scientific" it is meant that the concept is directly related to science and can be defined as the information attained by surveillance and experimentation, analytically verified, structured and constituted under universal ideologies (*Chambers Dictionary*, 1992). On the other hand, "technical" can be looked upon as meaning scientific information for applied practices. Byrne (2012:2) gives clear distinctions between technical and scientific text. He argues that "*while a technical text is designed to convey information as clearly and effectively as possible, a scientific text will discuss, analyse and synthesize information with a view to explaining ideas, proposing new theories or evaluating methods*." Thus, it can be clearly seen that scientific translation deals with pure science in all its concepts and methodologies; whereas technical translation deals with the application of the scientific information in the practical world. However, although the terms scientific and technical are not identical, these areas are grouped together in teaching translation. Byrne (2012:2) says "*The majority of translator training institutions offer modules with titles such as "Scientific & Technical Translation" or "Advanced Translation-Science & Technical" and presumably, this is a convenient way of organizing teaching provision.*"

As mentioned above, translation has a significant role in the dissemination of information as well as in the transfer of science and technology. The importance of STT may be realized

from the fact that in the realm of science and technology no country can live without communication and contact with the rest of the world and sharing in the new technological discoveries around the world.

Byrne (2012) also gives some reasons for the increasing demand for STT. He attributes these increasing demands to:

1. Scientific and technical translation in many respects represents the backbone of international trade and the scientific endeavor which fuels it.

2. Every product sold or specialized service provided – whether MP3 player, telephone conferencing systems, luxury cars, flame retardant cladding for use in the construction industry, online shopping websites, mobile phone services or designing a steel mill will require the involvement of science and technical translators at some point in its life-cycle.

3. Scientific and technical translation forms such a crucial part of modern industry and society that it is the subject of numerous laws, regulations and directives and many international scholarly scientific journals, even those which publish papers in various languages, require translations of abstracts at the very least.

Nowadays, STT is deemed to be even more important after the invention of the internet which links the world and gives a great chance for all people of different languages to communicate and access new technology and information.

Access to foreign technico-scientific information can only be created through the translation of foreign technical publications. Vast advances in science and technology create an increasing demand for such translation since it makes it possible to access the world's achievements in science and technology. EU Council Resolution C411states that for factories

and stores to be able to sell or distribute their technical products and appliances legally, all technical documentations relating to the product must be translated into the language of the country where the product is to be sold *(Council of the European Union,* 1998). This indicates the important role of the technical translator in all scientific and technical fields including medical, as (Byrne 2007:16) points out that

"... Directive 90/385/EEC, which deals with medical devices, and Directive 76/768/ EEC, which relates to cosmetics, state that documentation must be translated and it must anticipate potential risks." Thus, translation is regarded as an important method for the international exchange of scientific, technical and economic information.

Also, a scientist or a technologist who thinks and writes in one language needs to know about the work, ideas and results of someone who works and communicates in another language, which is a kind of information exchange. *"Scientific and technical texts are produced in response to a demand for information of a scientific or technical nature; such texts are translated because someone in a different language community wants to access or use the information these texts contain."* (Byrne 2006:7). When one translates one usually transfers the information from a given language (the source language) to another language (the target language) to be understood by the reader who can read and understand the target language only. The information in the SL should be the same as the information in the TL, but the translator gives it a 'different dress' so it can be understood by the reader.

To sum up, translation is the main means of transferring technological knowledge and information from one country to another around the world. Salama-Carr (1995) state that, without translation, the modern phenomenon of 'technology transfer' would not exist.

2.3 Technical text

A technical text is a text characterized by a certain volume of specialized terminology. Technical translation is concerned with the translation of these technical terms. In this regard, Ghazalla (1995:163) defines technical translation as:

> "*The translation of scientific and technical terms of all kinds: medical, physical, chemical, mathematical, mechanical, technological, biological, agricultural, computer and other terms of the various branches of science.*"

It can be assumed that STT is distinguished from other forms of translation by specialized technical terms which represent the main source of difficulty and challenge even for speakers of the SL. The more technical terms appear in the SL, the more problems arise in translating these terms into the TL. Additionally, the more knowledge a translator possesses about the subject matter in the ST, the more accurate a translation he/she will produce in the TT.

Moreover, with regard to technical texts, Dickins et al. (2002:184) suggest that:

> *"The term 'technical' is not confined to natural science and technology. Any specialist field has its own technical terms and its own genre-marking characteristics... we shall be applying the term 'technical' to texts written in the context of natural-scientific or technological disciplines."*

To conclude, a text which contains technical terms is called a technical text.

An example of a technical text is:

> *"Petroleum or crude oil is any naturally-occurring flammable mixture of hydrocarbons found in geologic formations, such as rock strata. Most petroleum is a fossil fuel, formed from the action of intense pressure and heat on buried dead*

zooplankton and algae. Technically, the term petroleum only refers to crude oil, but sometimes it is applied to describe any solid, liquid or gaseous hydrocarbons."[1]

The job of the technical translator is to deal with these technical terms, grasp these terms, understand their meaning in the source language (SL) and then to be able to choose the appropriate equivalent in the target language (TL).

All types of translation require the translator to be competent in both the SL and the TL and to possess a good understanding of all language/terminology. There is also another requirement, which is that the translator needs to be knowledgeable in the subject matter and in the specialized terminology of the technical fields concerned. The more knowledge the translator possesses, the better he/she will be able to translate technical texts. Such technical terms cannot be ignored as they carry the main meaning of the text.

2.4 Features of Translating English Scientific and Technical Texts into Arabic

Montgomery (2000) argues that information which has come into the world via the translation of technological and scientific knowledge has helped in a large way when it comes to the evolution of civilization and the development of the field of science and technology. Today's world is typified by the phrase 'the age of information' and the desire to have as much information as possible makes translation essential.

Although it is widely accepted that English is the universal language, efforts by governments of countries in which English is not the main language have been put in place to ensure that a maximum amount of information is obtained and translated in order to spread the knowledge required from English. For example, in Arab countries many academies and institutions have been established for the purpose of translation from English into Arabic (see 2. 5.3. below).

[1] The example is taken from http://chemistry.about.com/od/chemistryglossary/g/Petroleum-Definition

Thus, there is a need not only for publishing technical texts in other languages than English, but also for structuring and phrasing them so that they are easily readable (Ghazalla, 1995).

With regard to technical translation, many factors come to the fore such as terminology (including non-equivalence problems), translators' knowledge of the field of translation and the subject matter of the technical texts, and standardization issues. All these play a significant part in translation in today's ever competitive environment. (These will be discussed later in chapter three with reference to medical terminology)

Schubert (1987) argues that an environment has to be conducive for technical translation to take place and generally describes technical translation as being very complex and various. There are various facets which control the work that is undertaken by translators such as their materials and resources.

Gopferich (2008) talks about the non-equivalence issue in STT. He feels that a much broader context and approach, which is interdisciplinary in nature, needs to be adopted which goes beyond the traditional means of comparing scientific and technical translation in order to overcome the non-equivalence problems.

It is important for the translator to be aware of, and to be trained in dealing with, the technical terms that he/she comes across in translating technical text. In this regard, Sanchez (2010: 186) suggests that training in technical translation is an important criterion to help technical translators. He says "*a training programme can be devised for translation studies which can give the students the knowledge and the abilities that they require to become professional in such a complex field of research*."

With regard to technical translation, there is also an argument that has been advanced that it is very much confined to the cultural boundaries within which it takes place. Hempel (2006)

takes the case of German and Italian technical manuals to show how the culture of conventions can have an effect on the overall quality of the matter that is being researched. He believes that terminology, culture and prestige can sometimes prevent effective and efficient translation when taking into account the entire cultural point of view. There are a large number of checks that must be conducted because inter-cultural incongruity means that the same thing can be interpreted differently across various cultures. For example, the word fighting could be rendered into Arabic as قتال *qitāl* or جهاد *jihād* depending on the groups who are fighting or the reasons for the fighting. Muslims, for example, prefer to use جهاد *jihād* if the fighting is between Muslims and non-Muslim enemies. This is the case even with regard to a science that is based around terminology that has exact specific definitions and the existence of a hierarchical system for every term in the field.

Sometimes there is no consistency with regard to scientific and technical translation within the same language. Inconsistency means using different translations of/for the same SL term throughout a text or across relevant texts. Rogers (2008) points out that terminological inconsistency can be interpreted as the use of different forms for the same referent e.g. synonyms, orthographic variants and geographical variants in the same text or set of related texts, as well as hyponyms. A good case in point is that of Arabic itself, where there are large variances of terms when one moves from one region to another, and a large part of a translated piece can be lost in translation because of the lack of standardization. For example, in the Maghreb countries, which are influenced by the French language, they use السيدا *al-sīdā* as an equivalent for AIDS, whereas in eastern Arab countries, which are influenced by English, they use ايدز *aydz*. (Inconsistency will be further discussed in regard to medical terminology in chapter three.).

Mateo (1993) sums up the whole matter by emphasizing that scientific discourse tends to eliminate those morphological elements (relatives, auxiliaries and others) which can be

redundant from a communicative perspective. It prefers nominalized forms; its lexicon usually refers to the specialized vocabulary of a specialized field, and normally derives from original Greek and Latin words. Most scientific terms are either neologisms, loan words, new applications of words or outright coinage, eg. . Authors writing them wish to transmit their knowledge of the subject in the clearest and most direct manner possible. Scientific texts are normally canonical examples of 'communicative felicity'.

Also, in respect of technical and scientific terms, it should be stated that acronyms and abbreviations are common in English technical texts, especially in medical texts, whereas they are rarely used in Arabic (see 3.7 below). USA, WHO, HIV and Laser are examples of acronyms and abbreviations. Cronin (2003:152) argues that "*Alongside specialized terminology and numbers, acronyms and abbreviations are among the most attention-grabbing and potentially intimidating aspects of a technical text for translators.*"

Technical language is a form of formal language and draws its vocabulary, grammar and all its linguistics features from ordinary language. Vocabulary is not the only feature of a technical text that one should pay heed to. Style and grammar are other features that govern the words in a technical text. The present tense is used in technical text to discuss the main contents. Haddad (cited in Yaseen, 2013) and Al-Kharabshed (2003) point out that the language of science is characterized by the use of present tenses, abbreviations, collocations and compounds, e.g

> *The cartilaginous* ***structures*** *form the thoracic cage (rib cage), which surrounds the thoracic cavity and supports the pectoral (shoulder) girdle*[2].

Also, the use of passive voice is noted in technical texts. In this regard, Newmark (1988: 153) remarks that "*Technical language, especially in the case of English language, is*

[2] The example has been taken from http://nflrc.hawaii.edu/rfl/October2003/chung/chung.html

characterized by the use of passives, impersonality, empty verbs, third persons, and nominalizations." e.g:

> *"Petroleum, along with oil and coal, is classified as a fossil fuel. Fossil fuels are formed when sea plants and animals die, and the remains become buried under several thousand feet of silt, sand or mud."*[3]

Also it can be noticed that relative clauses are usually reduced in English technical text, e.g.:

> *"...most conditions are progressive, causing the muscles to gradually weaken over time"*[4]

The most important features of the language of science and medicine are accuracy, precision and objectivity. Haddad (cited in Yaseen, 2013) emphases that precision and objectivity are highly valued in the language of science.

A good translation is that which conveys the information in the SL to the TL and removes the language barriers between the writer and reader, and/or the speaker and the listener. Translation is not an easy job especially when it concerns two languages that are different in culture, alphabet and structure, as with English and Arabic. There are many linguistic differences which exist between English and Arabic. Arab translators should be aware of these differences so as to be able to produce a good translation which reflects the same meaning of SL in the TL.

[3] The example has been taken from http://www.petroleum.co.uk/

[4] The example has been taken from http://www.musculardystrophy.org/about_muscular_dystrophy/research_faqs/545_what_is_muscle_disease?gclid=CKOH-LPM6MACFRHHtAoduDgAig

2.5 Problems and Difficulties in Scientific and Technical Translation

Scientific and technical translation (STT) is important and essential especially in this 'era of technology' but it is not easy to achieve accurately. The transfer of information and technology from one language to another is limited by many restrictions since each language has its own characteristics such as grammatical and lexical properties and cultural aspects which create barriers to translators and readers of those texts. Hagege (cited in Cronin, 2003: 47) points out:

> *"Each language has a triple form of distinctness. Firstly, each language has a separate and distinct set of linguistic structures and by extension, to a greater or lesser extent, different linguistic representations of reality. Secondly, each language community has a specific set of social practices that are articulated through language. Thirdly, each language community is a discourse community or set of discourse communities that expresses history, culture, and beliefs systems through the discourses that have evolved within the community."*

This makes translating technical texts hard. There are many other problems that affect the understanding of the source language itself such as language changes and newly coined technical terms. Below are listed some of the difficulties of STT in general.

2.5.1 Language Related Problems: Semantic Shift

Information is organized in a language and this language has its own features and characteristics which make it different from other languages. Additionally, each language changes over time. Changes here means some words can be replaced by other similar or different words, new words are added to the language, and some words have received, or refer to, different meanings. Many terms may no longer be in common usage.

This kind of change happens as a result of changes in human culture and communities and because of the progress of technology. Many words have been introduced to different languages. For example, the term "globalization" is a new term that has entered English. Arabic terminologists at first struggled to find an equivalent for it, but eventually settled on العولمة *al-ᶜawlama*. Trask (1994:41) writes concerning language changes: "*like other aspects of language, the meaning of words can change over time. Two common types of change are the broadening and narrowing of meaning, but many other types can occur*". Changes in language are usually followed by changes in grammatical forms. Trask (1994:1) confirms that "*new words are constantly coming into use, and not only new words, but also new pronunciations and even new grammatical forms… old words, old forms and old pronunciations are gradually dropping out of use."* A good example of languages changing over time is that some English words that were used in Shakespeare's time are no longer used today, except in a religious context. For example, *thou* in Shakespeare's English means *you* and *art* means *are* so *thou art* means *you are*. So, the word *art* in Shakespeare's time does not convey the same meaning of *art* in our time. A translator should be aware of changes in language over time.

Finch (1969: 5) believes that "*the problem of technical translation becomes harder when there are new ideas and methods."* As a result of technological progress, various equipment, tests and drugs are invented every day. They need to be named, usually in English. On this subject, Khulwaileh (2000: 98) confirms that "*the problem side of vocabulary results from its changing nature which can be due to the changing nature of language in general and to the scientific, industrial and technological advances*." Accordingly, translators should constantly update themselves and keep up with the changes that the languages with which they are concerned undergo. Also, they should possess knowledge of the subject matter they are translating.

To conclude, all aspects of life undergo changes with the passage of time, including languages in all their fields, including the scientific and technical fields. Many new technical words constantly enter other languages and cause problems in finding an equivalent for each new term. And, in turn, such language changes influence translations.

2.5.2 Terminology Related Problems

The exponential growth of information technology that the world has witnessed at this point in time has led to mass publicity and the emergence of various ways of mass communication, which has facilitated and increased the world's direct access to knowledge and to scientific and technical progress. This raises the practical issue of controlling this flood of information and communication in order to serve people. There is the problem of controlling language, as language is the tool by which people express their ideas and needs and communicate with each other. The Arab world needs to access new technology from developed countries. But the problem of the huge numbers of new terms that follow in the wake of new technology and discoveries represents a major problem for Arab translators involved in STT. Al-Hattāb (1999) argues that the main features of scientific text are the technical terms, which provide major difficulties for Arab translators when finding an appropriate equivalent in Arabic. Technical terms carry the central meaning of technical texts. In this regard, Al-Kharabsheh (2003:37) stresses that "*terminology can be said to be the most central criterion characterizing this sort of translation and a solid yardstick against which the quality and success of STT can be gauged*." This shows that, in technical and scientific translation, problems of terminology occupy a central position. The quality of scientific and technical translation hinges upon the accurate rendering of concepts and their terms. Technical terms can frequently be found as multi-unit words. Examples are :

Deoxyribo nucleic acid. Expansion-pressure cylinder. Flip-flop circuit.

Therefore, a translator should be aware of such types of word construction.

The transfer of knowledge of science and technology from highly developed to developing countries has become a crucial necessity; hence the constant need for finding or coining required scientific and technological terms. The problem of coining a new Arabic equivalent for each technical term has been the concern of Arabic scholars. Al-Hattāb (1999) lists some difficulties in coining Arabic equivalents for scientific foreign terms. They are:

- The rapid technological and scientific developments in the world.
- The large numbers of scientific branches and fields leading to a huge number of new scientific terms.
- The lack of co-operation in the Arab world for producing and unifying Arabic equivalents for scientific terms.
- Some universities in the Arab world use either French or English (instead of Arabic) as the language of education in their science and medical departments. This means that Arab students and professionals will prefer to use either English or French instead of Arabic terms.

Many English technical terms have entered languages such as Arabic and are still waiting to be given equivalents. e.g. logistic, selfie, play station. It is sometimes hard to find equivalents for new terms when translating into other languages, including Arabic, for example:

Selfie is a new term that first appeared in *Oxford Dictionary* in 2013. It means "*A photograph that one has taken of oneself, typically one taken with a smartphone or webcam and uploaded to a social media website"*[5]. To date, there is no equivalent for this term in other languages

[5] See www.oxforddicionaries.com

including Arabic. In this situation, explanation is usually used when it is rendered into Arabic.

Some already existing terms are given new meanings. These terms should be dealt with as new terms. For examples, Twitter and Facebook are commonly used nowadays to refer to social websites with new meanings that are completely different from their original meanings.

What makes translations of some technical terms difficult is that some technical terms cannot be found in English-Arabic dictionaries. Also computer-aided translation tools are not helpful, sometimes, in giving Arabic translations for some technical terms. e.g the translation of *compressive strength* cannot be found by using computer aided translation tools. Using bilingual technical dictionaries (printed or online) and computer-aided translation tools may provide some assistance but the problem is that many technical and scientific terms such as abbreviations, collocations, compounds and new terms cannot be found in such dictionaries as dictionaries are not usually up-dated particularly swiftly.

If there is no equivalent in the TL, the translator could give an explanation for the term. This explanation would depend on his/her understanding of the subject matter.

Some specialised technical terms may not be known by the speaker of the ST. Hervey and Higgins 1992: 165) state that "*in terms of subject matter and interpretation, the typical technical ST is not easily accessible to most native SL speakers, let alone to those who have learnt the SL as a foreign language*." In undertaking such translations, the technical translator needs to bear in mind the terminology of both the SL and the TL.

Moreover, there is another problem arising from the specialized use of technical terms which is that many technical terms are not used in everyday, ordinary language and are, therefore, totally unfamiliar to the lay translator.

According to Dickins et al (2002), there are three sorts of problems arising from the specialized use of technical terms. They can be summarized as follows:

1. Technical terms which are unfamiliar to the lay translator because they are not used in everyday language, for example: allergenic, dermal, and many more. Without specialist knowledge, therefore, the translator cannot guess the exact meaning of the term.

2. Technical terms which are familiar to the lay translator as they are used in everyday language as well, but their technical senses are different from their familiar senses. For example: 'occupational' means 'connected with work', in Arabic الشغل *al-shughl*, but in a technical text such as 'occupational therapy' it has a different meaning. It means العلاج الوظيفي *al-ᶜilāj al-wazīfī* in Arabic. Using the familiar everyday use in technical text is clearly inappropriate.

3.Technical terms which have everyday senses that are not obviously wrong in a context, so the translator can easily fail to recognize the term as a technical term and can mistakenly render it in its ordinary sense, e.g.:

"All drugs should be stored in a dark and dry place."

Drugs, in the sentence, may either refer to medicine or to illegal substances.

To sum up, the translator of technical texts should be aware of the technical terms in the field he/she is translating in the SL and the intended meaning of the text and give the appropriate equivalent for each term in the TL.

2.5.3. The Lack of Co-ordination between Arab Countries with regard to the Issue of Standardization of Scientific and Technical Terms

Many Arab countries have established bodies that constituted Academies of the Arabic Language, such as the Academy of the Arabic Language in Damascus (Syria) مجمع اللغة العربية بسوريا *majmaᶜ al-lugha al-ᶜarabiyya bi Sūriyā*. This is the oldest academy regulating the Arabic language. It was established in 1918. The issue of Arabization was the major concern of this academy, especially in the area of education. It was the first attempt in the Arab world to use Arabic in the teaching of scientific fields including medicine. (Khashīm, 2006:167) says that "*Syria became the first, and remains the only country in the Arab world, to use Arabic in teaching medicine.*"

The main aims of this academy are to deal with the following tasks:

1. The Arabic language and its challenges.

2. The introduction of new scientific and technical terms.

3. The production of specialized dictionaries and glossaries.

4. The standardization of the Arabic language.

(Madkuur, 1981)

The Jordan Academy of Arabic مجمع اللغة العربية بالاردن *majmaᶜ al-lugha al-ᶜarabiyya bi al-urdunn* was set up in 1924. It was initially short-lived due to the scarcity of financial, scientific and human resources. The actual date of its inception was 1976. Many dictionaries and occasional publications have been produced by this academy as its main interest covers the arabization of technical and professional terms[6].

[6] See www.majma.org.jo/en_index.hm.

The Arabic Language Academy, Egypt مجمع اللغة العربية بمصر *majmaᶜ al-lugha al-ᶜarabiyya bi misṣr* was established in 1932. The members of the academy were from Egypt and from other Arab countries. The academy made great efforts to translate and coin new Arabic terms for foreign words. (Khashīm, 2006). Also, Versteegh (2001:178) emphasises that "*The main function of this academy (The Arabic Language Academy in Egypt) since 1960 has been the creation of new Arabic terminology".*

The Arabic Language Academy of Iraq مجمع اللغة العربية بالعراق *majmaᶜ al-lugha al-ᶜarabiyya bi al-ᶜirāq* was established in 1948 but it has been almost inactive since 2003 due to the invasion of Iraq. There are other Arabic Academies in the Arab world such as:

Academy of the Arabic Language in Khartoum (Sudan) مجمع اللغة العربية بالخرطوم *majmaᶜ al-lugha al-ᶜarabiyya bi al-khartūm*

Academy of Arabic Language in Rabat (Morocco) مجمع اللغة العربية بالرباط *majmaᶜ al-lugha al-ᶜarabiyya bi al-Ribāt*

Bayt al-hikma Foundation (Tunisia) مؤسسة بيت الحكمة بتونس *mu'assasat bayt al-hikma bi tūnis*

Academy of Arabic Language in Algiers (Algeria) مجمع اللغة العربية بالجزائر *majmaᶜ al-lugha al-ᶜarabiyya bi al-jazāi'r.*

Academy of Arabic Language in Palestine مجمع اللغة العربية بفلسطين *majmaᶜ al-lugha al-ᶜarabiyya bi filastīn*

Academy of Arabic Language in Libya محمع اللغة العربية ليبيا *majmaᶜ al-lugha al-ᶜarabiyya bi Lībiyā*.

These academies target translating works relating mainly to science and technology into Arabic. However, these attempts have encountered a number of problems including the lack

of Arabic technical terms and a lack of updated technical books, computer-aided translation tools and technical dictionaries. In addition to the Arabic academies, many other institutions of higher education and institutions of arabization and translation have been established in many Arab countries. These institutions have assumed the same role of coining and translating technical terms into Arabic which has caused a multiplicity of coiners, which has led to multiple equivalents for the same term in Arabic. Each institution has carried out their work independently. In this regard, Al-kharabsheh (2003:45) argues that:

> *"... A scientific book written in Iraq, for example, cannot be easily understood by Moroccan scholars in the same domain. That is because there is no standardised terminology in the Arab world. This chaotic situation can also be attributed to various linguistic and co-ordinational factors*."

These institutions include:

- The Institution of Research and Studies for Arabization معهد الدراسات و الابحاث للتعريب *ma^{c}had al-dirāsāt wa al-ābh̲āth lilta^{c}rīb*.

This was established in 1960 in Rabat, Morocco. It is linked to the Mohammed Al-Kh̲āmis University. The main concerns of this institution are arabization and terminology. The aims of this institution are:

1. The standardization of terminology in the Arab world.

2. Using Arabic as the language of all aspects of life, especially in the technical and scientific fields.

3. Using Arabic as the language of study and research[7].

[7] See http://iera.um5s.ac.ma/index.php?option=com_content&http://iera.um5s.ac.ma/index.php?option=com

- The Bureau for the Co-ordination of Arabization in Rabat مكتب تنسيق التعريب بالرباط *maktab tansīq al-taᶜrīb bi al-ribāṭ*

Another attempt made by Arab countries in the area of arabization has been the establishment of The Bureau for the Co-ordination of Arabization in Rabat after the first Arabization Conference held in 1961 in Rabat. The bureau became affiliated to the League of Arab States in 1969. The Bureau has representatives from all the members of Arab League to order to formulate joint decisions and to enhance the bonds of co-operation between Arab countries in the arabization field.

The aims of the Bureau are to:

1. Coordinate the efforts made by Arab countries to use Arabic in education, media and all aspects of life.

2. Unify the new technical and scientific terms and publish dictionaries.

3. Prepare and run arabization conferences in the Arab world[8].

The Bureau plays an active role in undertaking scientific research and arranging meetings and conferences. The Bureau also publishes an annual journal called مجلة اللسان العربي *al-lisān al-ᶜarabiī.*

- Arab Centre for Medical Literature المركز العربي للأدب الطبي *al-markaz al-ᶜarabi li al-adab al-ṭibbi*[9]

The Arab Centre for Medical Literature was established by a decree of the Higher Council of Arab Ministers of Public Health in Tunisia in March 1980. In Geneva in 1981 the Council agreed to have the Headquarters hosted by Kuwait and in November 1984 the centre was

[8]. See www.arabization.org.ma
[9] See www.arabization.org.ma

ready to begin work and to recruit appropriate staff. The administrative structure of the Arab Centre for Medical Literature is made up of a Board of Trustees. The Board members comprise 12 persons who are selected from doctors well known in their field of specialization in the Arab world, who are oriented towards arabization and the introduction of the Arabic language into medical science[10].

The Centre is concerned with the translation of medical information and books into Arabic. A department was set up to deal with this task. Salem (1988) states that the Center comprises four different departments, those being the department of information, the department of publishing, the department of financial and administrative affairs and the department of authorship and translation. The Center is largely responsible for putting in place plans and programmes for arabization in the medical field[11].

Many Arab scholars and researchers have been concerned about the issue of standardisation of scientific and technical terms in the Arab world. Reham and her colleague Welmsen (2009) have carried out research about regional standards and local routes in adoption techniques for specialized terminology in the different varieties of written Arabic. In their research, they examined seventeen technical terms compiled from original works by Arab authors and western books translated into Arabic. These were the product of twelve Arab authors and translators writing or translating works in the fields of sociology and psychology. Terms extracted from these works were checked against 16 general and specialist dictionaries and three United Nations glossaries. They found that terminological discrepancies and inconsistencies were to be found in all of these works. Also, Saraireh (2001:35) points out that:

[10]. See www.deepdyve.com/lp/sage/arab .

[11]. See http://www.deepdyve.com/lp/sage/arabhttp://www.deepdyve.com/lp/sage/arabhttp://www.deepdyve.com/lp/sage/arab

"*Standardization is one of the basic elements of technical translation for proper communication among the users of the target language text. Consistency in signifier-signified correspondence is vital to maintain proper standardization."*

Standardisation is needed for translations to be understood by Arabs from different Arab countries. Al- Zurqān (1998), who wrote an article in an online arabization journal titled "الدعوات المبكرة لتوحيد المصطلح العلمي العربي"which means "the early requirements for the unification of scientific Arabic terms"[12],argues that:

> "*The requirement for the unification of scientific terms started at the beginning of the 20th century as the result of technical and scientific developments and the diversity of their sources, leading to many scientific translations undertaken by different translators without supervision and observation. This ended up with many different equivalents for the same term in one country as well as in different Arab countries. This is because each Arab country has its own translations of foreign terms which undoubtedly create confusion among Arab readers and researchers and this makes Arab readers think that the Arabic language consists of many languages and one scientific term has many Arabic equivalents*." (The researcher's translation from Arabic)

The requirements for standardisation in the Arab world is not a new issue. SalĪbā in 1958 wrote about the necessity of standardization of scientific terms. He argues:

> *"The characteristic of translation in modern life is the diversity of scientific translation. As a result, there is a diversity within translators, within their culture, academic background and their Arabic knowledge. One translator may translate one scientific term by using two different equivalents or use one term for two different meanings. All of these lead to poor translation into Arabic and we can only sort out*

[12]12. Available on. www.arabization.org.ma/downloads/majallat/41/docs/69.doc

this problem by unifying scientific terms in the Arab world." (SalĪbā , 1958:72, the researcher's translation from Arabic).

The above scholars' concerns also make it difficult for Arab terminologists and scholars to apply arabization. Among those scholars is Dr Marwan Al-Weza, a lecturer in infectious diseases in the College of Medicine, Damascus University. Al-Weza presented a paper at the Arabization Conference held in Egypt in September 2003 concerning the problems of translating medical sciences and arabization entitled " اشكاليات ترجمة العلوم الطبية و تعريبها" *ishkāliyyāt tarjamat al-ᶜulūm al-ṭibbiyya wa taᶜrībiha* which means "the problems of translating medical sciences and their arabizations.

In his paper, Al-Weza asks[13]:

•Is the Arabic language a living language?

•Is arabization a necessary issue?

•Do we have enough professional translators in the Arab world?

•If Arabic was the language of science in the medieval era, why cannot it be the language of science in the modern era?

As we can see, although the official language of all Arab countries is Arabic, ten Arabic academies and institutions are working in various parts of Arab world to deal with issue of arabization and standardization independently. This complicates the problem of standardization. Many Arab countries have not given up on this issue and have tried to build up the idea of creating an association of Arabic academies in the Arab world. In 1971 Arab countries attempted to unite the Arabic Academies into one institution and chose The Union

[13] http://www.emro.who.int/AHSN/meetings/sep03/day1/Dr.%20Marwan%20Alweza.ppt#256,1

of Arab Scientific and Language Academies in Cairo to be the agent of an association of Arabic Academies in Arab countries.

- The Union of Arab Scientific and Language Academies in Cairo (Egypt) اتحاد المجامع اللغوية العلمية العربية بالقاهرة *titihād al-majāmi^{c} al-lughawiyya al-^{ci}ilmiyya al-^{c}arabiyya bi al-qāhira*

In 1971 Syria, Iraq and Egypt agreed to establish the Union of Arab Scientific and Language Academies in Cairo. Later on Jordan, Sudan, Tunisia, Morocco, Libya and Algeria joined the association.

Each Academy of Arabic language in Arab countries chooses two members to represent it in the Union of Arabic Academies, whose members meet once a year[14].

The main aims of the association are:

1. To link the Arabic Language Academies in the Arab World and to coordinate their efforts in the Arabic language field. In addition, to organize ways of communication between the academies.

2. To unify the production of technical and scientific terms including medical terms[15].

The union of Arab Scientific and Language Academies and its aims represent the efforts of Arab scholars in regard to arabization and the standardisation of technical terms. Although the attempt was made in 1971, the problem of standardisation of technical term is still unsolved.

The Union identified some problems such as:

[14] See www.majma.org.jo
[15] See www.majma.org.jo

1. The Union could not keep up with the huge number of technical terms that enter the language every day, which leads to a lack of updated scientific and technical dictionaries and a lack of translated works into Arabic.

2. Political issues in the Arab world sometimes influence the links between the Arabic academies.

Although Arabic is a living language and rich in terms of linguistic sources for word creation and derivations, many technical and scientific terms have no equivalents in Arabic. On the other hand, some technical terms have more than one equivalent as a result of a lack of co-ordination in terms of arabization and standardisation in this field. This fact has been emphasised by Sieny (1987), who attributed the confusion in Arabic technical terminology to many factors. One of them is the linguistic factor, which includes: the rich nature of the Arabic language, which would result in a large number of synonyms for the same concept, as well as the different procedures in coining Arabic technical terms. These make it difficult for the Arabic technical translator who usually depends on technical dictionaries and computer-aided translation tools to look up technical terms.

Many Arab scholars, terminologists and translators have attempted to express their concerns and have presented their ideas on many occasions, at conferences and in journals, in order to help tackle such problems. Among these are:

Al-Hattāb (1999) who wrote an article entitled "المصطلحات العلمية و اهميتها في مجال الترجمة" *al-mustalahāt al-ᶜilmiyya wa ahamiyyatuha fi majāl al-tarjama* which means "scientific terms and their importance in translation" in the *al-Lisān al-ᶜarabi* Journal. Al-Hattāb suggests some pointers for Arab academies and institutions that are concerned with the Arabic language and arabization in order to overcome these difficulties:

• There should be co-operation between Arab specialists and experts in the scientific field and experts in Arabic linguistics to agree on unifying scientific terms in the Arab world.

• Compose Arabic scientific dictionaries and books.

• Encourage scientific research on producing technical terms.

Al-Weza (2003) suggests some recommendations to tackle STT problems, which can be summarised as:

•Support the experts who work in translation financially and emotionally.

•Provide training courses for translators.

•Adopt the *Unified Medical Dictionary* published by the regional office of The World Health Organization as the standard reference dictionary for translation.

•Focus on the translation of new medical terms and keep the old ones as they were translated.

•Always ask for advice from specialists and experts when creating new Arabic equivalents for each foreign term.

2.6. Computer-Assisted Translation (CAT) and Machine Translation (MT)

The development of technology has its impact on all aspects of our life, including communications and translation work. The progress in modern communications has increased the demands for translations and placed demands on translators to adopt and involve new technologies in their translation works. Computers and the internet have changed communications, business, and translation activities throughout the world. New translation technologies involve specific tools and technology adaptable to the needs of the translators. These tools include some electronic resources, translation memories, term bases, cloud-bases, server based translation system and terminology management systems. Byrne (2012:17) says

that "*Computer-Assisted Translation or CAT tools include translation memory systems, terminology management systems, electronic corpora, term-bases and sometimes machine translation. These tools are designed specifically for translators and are unique to translation*". They are assisted by computer, and organized and developed by translators to help "translators" reuse the saved translations. Bowker (2002:95) points out that "*Translators have long been term banks users; however, they are increasingly involved in developing and managing terminology resources, such as term bases that are integrated with computer-aided translation (CAT) tools".* CAT tools assist translators in their translation activity and help translators work faster and better, increase translation quality and maintain consistency. The main feature of a CAT tool is to save the translation units in a database called a *translation memory* **(**TM**)**, in order to be re-used for any other text. CAT tools store segments of text with their translation (ST and TT) . A segment can be a sentence or paragraph, whereas terminology tools contain list of approved terms.

MT refers to automatic translation where human intervention is not needed. In this regard, Craciunescu et al (2004) point out that while MT is generally not yet able to provide output that is suitable for publication without human intervention, CAT represents an ideal scenario, because human feedback is always available. MT and CAT tools do not provide the same support to the translators. Bowker (2002) draws a comparison between MA and CAT. He argues that the major distinction between MT and CAT lies with who is primarily responsible for the actual task of translation. In MT, the computer translates the text, though the machine output may later be edited by a human translator. In CAT, human translators are responsible for doing the translation, but they may make use of a variety of computerized tools to help them complete this task and increase their productivity. Therefore, whereas MA systems try to replace translators, CAT tools support translators by helping them to work more efficiently.

In the end, nothing can fully replace the role of human translators in the translation process, and all of the new translation technologies are to support the translator and not to replace him/her. Craciunescu et al (2004) made an analysis of the capabilities of MT and CAT. and concluded that:

> *"It is clear that computers could not even begin to replace human translators with such texts. Even with other kinds of texts, our analysis of the roles and capabilities of both MT and CAT shows that neither is efficient and accurate enough to eliminate the necessity for human translators."*

In their article, they argued that MT is a translation method that focuses on the source language, while human translation aims at comprehension of the target language. Machine translations are therefore often inaccurate because they take the words from a dictionary and follow the situational limitations set by the program designer.

Regarding English - Arabic translations, MT cannot grasp the grammatical and cultural equivalences in both languages. Jebbar (2014)[16] believes that any attempt to replace human translation totally by machine translation would certainly face failure for the simple reason that there is no machine translation that is capable of interpretation. For instance, it is only the human translator who is able of interpreting certain cultural components that may exist in the source text and that cannot be translated in terms of equivalent terms.

From the above discussions, it should be noted that if CAT tools and MT are updated frequently, they could be a staple support of all professional translators' activities regarding translation technical terms. Byrne (2012) believes that CAT tools and MT are most commonly used in technical translation where the nature of the documents means that there is frequently a high proportion of repetition and where new product releases require existing documents to be updated.

[16] at Available at http://www.translationdirectory.com/articles/article1326.php

2.7. Conclusion

This chapter has presented a brief background on STT and its factors, features and problems in the Arab world. Technical text is usually distinguished from other types of texts by its technical terms. Technical terms are the main problem that technical translators encounter when they are dealing with technical text.

The following points summarize what has been addressed in this chapter.

1. STT is very important and is the main path for technology transfer around the world.

2. STT is not easy work and involves many difficulties.

3. The major feature of scientific technical texts is their vocabularies, which are more specialized when contrasted with ordinary language. Technical terms represent the main problem in translating technical texts.

4. Technical translation into Arabic requires an understanding of translation functions, editing and terminology, documentation and referencing.

5. A translator's knowledge of the subject matter behind the text is very important. Technical translators are required to have a good understanding of the source language (SL) and a proficient use of the target language (TL). The more knowledge that a translator possesses about the subject that which he/she translates, the more accurate a translation he/she produces.

6. Technical translators usually rely on technical dictionaries, computer-aided translation tools (CAT, translation memories, term bases, terminology management systems, cloud-bases and server based translation system) and websites beside their own knowledge but these resources often do not provide too much help for Arabic translators as many new technical

terms cannot be found in English-Arabic dictionaries ortechnological translation supports. On the other hand, because of the co-ordinational problems between Arab countries, some technical terms have more than one equivalent in Arabic (inconsistencies) which can cause confusion for translators and for the TL reader.

7. Non-equivalence, new terms and a lack of standardisation of technical terms in the Arab world are the main problems that the Arab translators face.

8. STT seeks transparency, accuracy and clarity.

9. Translations of scientific and technical terms need to be updated as many terms enter languages over time and some become no longer in use or are replaced by other terms. Language change subsumes meaning change which is one of the problems of STT.

Chapter Three: Medical Terminology and How it Works

Chapter Three: Medical Terminology and How It Works

3.1 Introduction

Medical and religious translations are amongst the oldest forms of translation (Berghammer, 2006). Also, Fishback (cited in Pilegaard, 1997) argues that translating medicine is regarded as the "*most universal and oldest field of scientific translation because of the homogenous ubiquity of the human body.*" The history of medicine can be traced back to centuries ago when the Greeks established what have now become modern scientific methods. It slowly but surely began to spread its influence to the Roman Empire (which fell in AD 476), then to medieval Europe at the turn of 5th century and to modern Europe in the late 15th century (Montalt and Gonzalez, 2007). As times have evolved, dominance in knowledge has affected language relationships. English has gained added importance (especially in the 20th century) following on from the demise of Latin. This is also true for the field of medical research where English has been extremely widely used. The language of medical research in most medicine schools and institutions in the world, including most of the Arab countries, is English. Ismail (2001: 68) argues that "*out of over 90 schools of medicine in the Arab world, only 5 teach in Arabic others use English apart of medicine schools in Tunisia, Morocco, Algeria and Lebanon they use French*". Many English terms have been inevitably used by many other languages. Terms such as AIDS, virus, bacteria, influenza and computer are commonly used in most Arab countries.

Berghammer (2006) believes that someone who can speak two languages can take part in the activity of translation. It is important to have a sound understanding of the source and target languages, particularly so in the field of medicine where it is vital to have learnt the language of medicine. The information of the SL needs to be understood by the TL reader. In this

regard, Afaf and Matthias (cited in Yaseen, 2013) say that for any given medicine, necessary information needs to be explained clearly in the patient's native language in any country where the drug and product are approved in the respective market. Knowledge of the subject matter and the language are closely interlinked and translators must know the aspects that are required to be addressed in order to overcome the challenges that are likely to be faced in their path towards success. The various genres that they work in include, but are not limited to, biomedical articles, monographs, clinical reports and study protocols.

Medical translation is a very sensitive field as it deals with human beings' lives and health; thus the translator of medical texts has to work hard and proficiently as s/he has to understand the source text and then find out the appropriate lexical equivalent in the target language. The translation of medical texts should be as accurate as possible.

Many medical terms are either long or consist of more than one part which makes them difficult to understand in the SL. This chapter discusses the morphological structure of English medical terms. Such a structure may be a single free morpheme which always consists of a root or may consist of more than one morpheme, which are usually prefixes, suffixes and/or combining vowels (linking vowels).

This chapter also reviews the derivations of English medical terms, illustrated with examples. It analyses Arabic medical terms as well. It discusses equivalence problems in medical translation which involve both grammatical equivalence and cultural equivalence. As this study is about terminology, and abbreviations and acronyms are commonly used in English medical terminology, discussions on the problems of acronyms, abbreviations, loan words, collocations and compounds will also be included . The problems of polysemy, non-equivalence, inconsistency and neologisms will be discussed. All will be illustrated by examples. Then strategies which could prove useful for solving the problem of equivalence in

translation (such as addition of information, deletion of information as well as structural readjustment) are suggested. Also, this chapter talks about three methods used by Arabic translators in rendering English words into Arabic, which are translation, transliteration, and arabization. A review of standardization of medical terms and globalization, in terms of translation, will be discussed. At the end of this chapter a review of English-Arabic medical dictionaries will be presented.

3.2 Medical Terminology

Davies (1985: 13) defines medical terminology as "*the study of words used to communicate facts and ideas particular to medicine; it is chiefly concerned with the present use and meaning of such words.*" Medical terms refer to words, compounds, abbreviations and acronyms that are related to medicine.

In terms of origin, medical terminology can be classified under three groups:

A. Words which are taken from ordinary English vocabulary.

B. Words which are taken from another language.

C. Words which have been invented.

The English language contains a number of words which have been taken from another language with little or no change of spelling. When checking English-English medical dictionaries, it can be noticed that the majority of medical and scientific words have been taken from Latin or Greek. Words from Latin often refer to anatomy, such as those representing many parts of the human body, e.g. cerebrum, pelvis, cornea. The words that are taken from Greek, and are unaltered, are words such as thorax, stigma, iris, helix. Both the Latin and Greek words that have been adopted have kept their original meanings. In this regard Albin (1999) believes that Latin is the language of choice for anatomical

nomenclature, whereas Greek is the language of choice for pathology. On the other hand, Davies (1985) believes that most medical terms are of Greek origin. Davies (1985) explains the reasons for the Greek origin of medical terms as being due to the physicians of ancient Greece, notable among whom was Hippocrates (born circa 460 BC on the island of Cos) who was the first to introduce scientific methods into medicine. John (2005) presents more reasons for the Greek origins of medical terms. He argues that:

> *"Modern Western medicine traces its roots to the 5th century BCE, when the Greek physician Hippocrates (460-377) first attributed illness to physical causes, distinguished medical practice from priestly ministrations, and taught diagnosis by observation and treatment by fostering or restoring natural processes. Hippocrates and his disciples and successors, notably Galen (CE 130–201), produced a large and diverse body of medical writings in Greek. Many of the anatomic, pathologic, and therapeutic terms found in those writings remain in use today, some with little or no change in meaning."*

After Greek, Latin became the universal language. Davies (1985) states that, after the decline of Greek civilisation, there was a shift from the use of Greek to the use of Latin as the international language for scholars throughout the Western world. The Latin tongue obtained this dominant position through the rise of the power of Rome, but maintained it for many centuries after the fall of the Roman Empire (AD 476).

From the beginning of the Christian era to the early 19th century, Latin was the universal language for scholarly communication, because it was the language of the Roman Empire, which included most of Europe, parts of Asia, and Africa. Latin was kept in use as an international medium because it was more widely known than any regional language. Later, when it had died out as a spoken language, a scientific and technical nomenclature based on Latin seemed likelier to resist semantic drift and erosion than a vernacular one (John, 2005).

The scientific or medical words that have been invented since the heyday of Greek and Latin medical terminology are words that, because of the advances in science and technology, require new terminology in order to cater for the new discoveries. Most classical languages cannot cater for modern discoveries, inventions and concepts. For instance, there is no Latin word for the internet. It follows that the discovery of the internet made it a prerequisite that such a term should be coined..

In many English medical words word-elements are used in the structures of word-building. For instance, the Greek noun nephros (kidney) is used in the combining form nephro- (or nephr-) with other words. Thus the terms nephropathy (disease of the kidney), nephralgia (pain in the kidney), nephritis (inflammation of the kidney) or nephroptosis (a dropping of the kidney), nephrotomy (a cutting of the kidney), nephrectomy (a cutting out), nephrorrhaphy (a sewing up) or nephropexy (a fixing in place) are acquired. This will be discussed further later in this chapter.

Similarly, in the process of word-building, very long words can be broken down into their component parts and thus their meanings can be understood. For instance, the word postzygapophysis (the articular process of a vertebra) [17] where a Latin prefix and two of Greek have been added to the Greek word physis. Such names are understood by specialists because of the components making up the term coined. Affixes will be discussed later in this chapter.

As will be self-evident, medicine is related to drugs, treatment, disease, medical equipment and the specialist clinics within medicine. The translation of medical terms is an essential part of the translation process of medical text. In this regard, Montalt and Gonzalez (2007) argue

[17] .See http://dictionary.thefreedictionary.com/ Postzygapophysis

that, in the translation process, more than half of the time is invested in detecting and solving terminological problems.

3.3. Analysis of English Medical Terms

Some English medical terms which are of Latin or Greek origin such as anthelmintic, erythrocyte, hypergammaglobulinaemia, and many more, are complex and hard for English native speakers to understand, let alone non-native speakers. On the other hand, there are many simple medical terms that consist of a single free morpheme, such as fever, kidney, cancer, and many more, which are easy to understand and then translate. Additionally, they can be found in bilingual dictionaries.

There are also common medical terms (lay terms) which are used by people at large who are aware of their meanings, such as flu, hay fever, blood test, eyes etc.

In medical reports, doctors usually use scientific medical terms, but on leaflets and advertisements, which are written to be read by the public, they usually use lay medical terms. Scientific and complex medical terms usually cause the main problems for the translator of medical texts.

The following examples show popular medical terms which are used by medical staff and patients and the corresponding scientific medical terms which are used by medical staff.

Table 1: Some Lay Terms with their Corresponding Scientific Medical Terms

Lay terms (popular terms)	Scientific terms
Tummy	Abdomen
Fit	Epilepsy

Baby (during pregnancy)	Foetus
Bleeding	Haemorrhage
Toothache	Dentalgia
Longsightedness	Hypermetropia

Newmark (1988) believes that there are two kinds of scientific terms, which are academic and professional terms. He suggests that there are three categories of English medical terms based on medical vocabulary, which are:

- Academic. This includes transferred Latin and Greek words associated with academic papers, e.g., 'phlegmasia alba dolens'.
- Professional. Formal terms used by experts, e.g., 'epidemic parotitis', 'varicella', 'scarlatina', 'tetanus'.
- Popular. Layman's vocabulary, which may include familiar alternative terms, e.g. 'mumps', 'chicken-pox', 'scarlet fever', 'stroke', 'lockjaw'.

Most medical terms consist of one or more word parts or morphemes. These word parts are roots, prefixes, suffixes, and linking or combining vowels, and many of them are of Greek or Latin origin. Any medical term may contain one, two, or all of these categories.

3.3.1 The Word Root

The root is the main part of a word and contains the essential meaning. Hutton (2006:2) states that "*roots are the basic medical words. More are derived from early Greek and Roman (Latin) words. Others have their origins in Arabic, Anglo-Saxon and German."* For example, the primary root of the term *cytogenesis* is *cyt* which comes from the Greek word *kytos***,**

meaning cell. The suffix *genesis* means origin so cytogenesis means the origin and development of cells. Many terms can be built up from the same root; consider these examples:

Electro**cardi**ogram

Cardiology

cardiovascular disease

Peri**cardi**tis

All the above terms are related to *cardio* which means heart; *electrocardiogram* means a record of the electrical activity of the heart, *cardiology* refers to the study of the heart, *cardiovascular disease* is a disease affects the heart and blood vessels, *pericarditis* means an inflammation of the outer layer of the heart (*Webster's Medical Dictionary*, 2007)

A root can also be found in the middle of a term such as in *periadentitis*. The root "aden" is a Greek word meaning gland, the prefix *peri* means surrounding and the suffix *itis* means inflammation, so *periadenitis* means an inflammation of the area surrounding a gland. Sometimes the root can be used at the end of words such as *lymphocyte* which means a white blood cell formed in the bone marrow and distributed throughout the body in lymphatic tissue (*Stedman's Medical Dictionary*, 2006). *Cyte* , which means cell, is the root.

Medical terms may contain more than one root. The term *neurocyte* consists of *neuro* meaning nerve and *cyte* meaning cell. The meaning of *neurocyte* is, therefore, nerve cell.

Some medical terms have more than two roots as "*neuroencephalomyelopathy*" which is a disease of the brain, spinal cord and nerves. The term *neuroencephalomyelopathy* can be divided into three roots: *neur-o-encephal-o-myelo* and the suffix *pathy.*

Knowing which part of the term is the root and understanding the meaning of the root helps to get the meaning of the whole term.

3.3.2 Prefixes

A prefix is a part of a word. It is found at the beginning of a word, as in **anti**body, **per**anum, **oro**nasal etc. Each prefix has a meaning, for example, *anti* means against, *hydro* means water, *per* means through etc.

Prefixes usually add to, change or modify the meaning of the word root. For example, the word *natal* means pertaining to birth; adding the prefix "*ante*", which means 'before', changes the meaning: *antenatal* means pertaining to before birth. The prefix "*ab*" which means from, away from, when added to a word such as *normal*, will change the meaning of the word. Normal becomes *abnormal* which is the opposite of normal.

The same prefix may be added to different words. For example, the prefix *anti* means against if added to these words:

Bacterial - *antibacterial* means bacteria killer.

Biotic - *antibiotic* is a substance which has the ability to destroy the development of a living organism.

Helminitic – *anthelminitic* meaning pertaining against worms.

It is very useful to understand the prefixes used with medical terms in order to assist in tackling the problems of medical translation.

3.3.3 Suffixes

A suffix is often found at the end of a term to give it a new meaning. The suffix *cide* when added to the word *fungi* changes the word into *fungicide* which means fungus killer. When the suffix logy, the study of, is added to the word root *laryng* which means larynx, it forms the term *laryngology* which means "the study of the causes and treatments of disorders of the larynx" (*Mosby's Medical, Nursing and Allied Health Dictionary*, 1998:917)

Each suffix has a meaning. For example, the suffix *ectomy* means a cutting out, *emia* refers to a blood condition. Understanding the meaning of each suffix helps to understand the meaning of the whole word.

A medical term must have at least one root but does not have to have a prefix and/or a suffix, for example, the term *erythrocyte* meaning red blood cell. It can be divided into two roots: *erythr* means red and *cyte* means cell.

Some medical terms have both a suffix and a prefix with the root as in *antisepsis*, meaning against infection. It contains the prefix *anti*, the suffix *sis* and the root *sep* which is derived from the Greek word *sepein* meaning putrefaction.

Prefixes and suffixes also add to, change or modify the meaning of the word root.

3.3.4 The Combining (linking) Vowels

Combining vowels are linking vowels. They are used to link a suffix with the root and sometimes the root with another root to make it easier to pronounce. The combining vowels *o, i* and *a* are commonly used with medical terms (Hutton, 2006).

For example:

Chromosome: "o" is the combining vowel. Chromosome, meaning stained body, consists of the root *chrom* meaning colour and the suffix *some* meaning body linked by the vowel "o".

Osteocyte: "o" is the combining vowel. The word consists of two roots *oste* meaning bone and *cyt* meaning cell linked by the vowel "o". *Osteocyte* means bone cell.

Suffixes and roots do not have to be linked by vowels if the suffix begins with a vowel as in *gastritis***.** It consists of *gastr* which is the root meaning stomach and *itis* meaning inflammation; together they form the term gastritis meaning stomach inflammation[18].

To sum up, being aware of the meaning of each part of a medical term will help to tackle the problem of understanding the term in the SL and will therefore help in translating the term. Montalt and Gonzalez (2007:232) state that *"a knowledge of the Greek and Latin roots, prefixes and suffixes provides the basic building blocks of medical terminology and enables us to infer the meaning of the whole".* Understanding the meaning of affixes and familiarity with the meaning of the most frequently used roots, prefixes and suffixes will assist in clarifying the whole field of medical terms. With a little study, it will be found that the long and formidable sounding medical terms are combinations of words which describe parts of the body, a function or a condition. A knowledge of the meanings of roots, prefixes, and suffixes enables translators to analyse medical terms into components.

3.4 Derivation of English Medical Terms

To derive a word means to produce a new word from another word by adding an affix and some are derived from concepts or objects that are associated with them. It is the formation of a new word from another word stem. It typically occurs by the addition of an affix. The derived word often carries a different meaning from the original one.

[18] See. http://msjensen.cehd.umn.edu/1135/Worksheets/medterms/mterm2.htmlhttp://msjensen.cehd.umn.edu/

Jaber (2007) argues that, because of the significance of technical terms, specialists have paid attention to the processes of creation, designation, distribution, standardization and documentation of technical terms falling within their areas of scientific research.

The derivation of English medical terms is summarised below.

•As has been discussed previously, most English medical terms are derived from Greek and Latin. Some have their origins in Arabic (see examples below). Many popular medical terms which were inherited from Latin and Greek are still commonly used such as *medicine* which comes from the Latin *medicina.* *Clinic* is a Greek word meaning bed; *hepatitis* is a Greek word consisting of *hepat* meaning liver and the suffix *itis* meaning inflammation, so hepatitis means an inflammation of the liver. And many more words derived from Greek and Latin are used as scientific terms. For example, *dysentery* is derived from the Greek word *dysenteria* and refers to a disease marked by frequent watery stools (*Stedman's Medical Dictionary*, 2006: 596).

Some terms are derived from Latin and Greek, English and Greek or English and Latin. These are called hybrids and one example is the term *bactericide.* Bacteria is derived from the Greek word *bacterion* and the suffix *cide* is derived from a Latin word *caedere* which means kill. Another example, the term "deshydremia" consists of three parts; de- is a Latin prefix which means away from, hydor is a Greek word which means water and haima is a Greek word that means blood. *Deshydremia* is hemoconcentration due to the loss of water from blood plasma (*Stedman's Medical Dictionary,* 2006: 522)

Some terms of Arabic origin are still used in English such as alcohol الكحول *al-ku<u>hū</u>l* , *alkali* قلوي *qalawī*, sugar سكر *sukkar* and syrup شراب *<u>sh</u>arāb.*

2. As mentioned above, many English medical terms are derived by adding affixes. Examples include the suffix *ache* which means pain as in headache, stomach-ache and toothache, and the suffix *pox* in chickenpox, smallpox and cowpox. *Pox* is a plural form of *pocke* which means blisters.

New terms have been derived by using roots from classical languages or by adding prefixes and suffixes to roots derived from classical languages in order to create words needed for particular contexts. For example, the general name for animals such as snails and slugs which apparently walk on their stomachs was derived from the Greek roots *gast(e)ro-* (stomach) and *-pod* (foot) and formed the new word gastropod. When someone wanted a word to describe a speed greater than that of sound he took the Latin prefix *super-* (above, beyond) and the Latin root *son-* (sound) and invented the term "supersonic".

3. Some medical terms are derived from concepts or from objects that are associated with them.

- Some are derived from places

These terms are called after the places where the diseases were first discovered or spread, such as:

Lyme disease which is an acute recurrent inflammatory infection transmitted by a tick borne spirochete. The condition was originally described in the community of Lyme (*Mosby's Medical, Nursing and Allied Health Dictionary*, 1998:965).

African tick-bite fever which is a febrile disease caused by the bacterium *Rickettsia africae* in southern Africa (*Stedman's Medical Dictionary*, 2006:713).

This disease is mainly spread throughout South Africa.

- Some are derived by using a colour.

Yellow nail syndrome: a condition in which there is complete or almost complete cessation of nail growth and loss of cuticle. The nails become thickened and yellow to yellowish green. (*Mosby's Medical, Nursing and Allied Health Dictionary*, 1998:1742)

- Some are derived by using a body location such as:

Spinal fluid culture which refers to the sample (culture) that is taken from the spinal cord.

4. Some medical terms are derived from a person's name, usually the one who invented the equipment, or discovered disease, etc. The following are examples:

Alzheimer's disease: the word 'Alzheimer' is derived from Alois Alzheimer, a German neurologist who discovered the disease.

Down's syndrome: is named after John Langdon Down, an English physician who discovered the nature of the syndrome.

Parkinson disease: is derived from James Parkinson who discovered this disease (Davies, 1985:258).

Ewing's disease: is a rare malignant neoplasm of bone, named after J. Ewing who was an American pathologist (Davies, 1985:258).

Some medical terms are derived from the persons' names of those who are associated with the term such as:

Lou Gehrig's disease which is named after its most famous sufferer, Lou Gehrig, a hall-of-fame baseball player for the New York Yankees.

Caesarean section: Julius Caesar was supposed to have been born in this way (Roberts, 1971:28).

3.5 The History of Medical Arabic

Arabic belongs to the Semitic family of languages. Arabic remained confined to Arabia until the beginning of the third decade of the seventh century (Bakalla, 1984). Arabs speak different languages as each tribe used to have its own dialect. These dialects would probably have become languages in their own right. These dialects started to unify as a unified language after the emergence of Islam. Gutas (1998:11) states:

> *"Although by 732 the new empire that was founded on and organized in accordance with the religion revealed to Muhammad, Islam, was to extend yet further afield - from Central Asia and the Indian subcontinent to Spain and the Pyrenees - the heart of the new civilization which it generated lay in the centres of ancient civilization, from Persia through Mesopotamia and Syro-Palestine to Egypt".*

The spread of Arabic was strengthened by the spread of Islam and thus it has become the second language in many Muslim countries around the world. Alma'ni (2000: 93) argues that *"Islam greatly contributed to the development of Arabic as it became an international language. Thus the spread of Islam was the main factor in helping to spread Arabic*"

3.5.1 Medieval Arabic Translation

Arabic translation was active during early Abbasid rule (eighth century AD and early ninth century AD) (Alma'ni,2000). Others have further argued that an Arabic translation movement took place in the era of Abbasid rule. Gutas (1998:24) believes that:

"The translation of Greek works into Arabic appears not to have been present in Umayyad times. Only with the earliest Abbasid caliphs was there set into motion a deliberate translation movement that had profound historical, social and cultural consequences".

Most researchers agree that a medieval Arabic translation movement started in the period of Abbasid rule and reached its peak during the rule of the Caliph al-Ma'mun (813-833) who established بيت الحكمة *bayt al-hikma* (House of Wisdom) to deal with translation matters. Al-Ma'mun encouraged translators to translate Greek works especially in astronomy and medicine into Arabic. Many of these medical works were written by Galen. Montalt and Gonzalez (2007) describe Galen as one of the most famous exponents of Greek medical knowledge. He was a prolific author writing some four hundred works based on the Hippocratic tradition. Montalt and Gonzalez (2007:16) add that *"in the 9th century much of his work was translated into Arabic at the House of Wisdom in Baghdad*". Many translators who translated Greek works on medicine lived under Abbasid rule like Hunayn ibn Ishaq (809-873) (who was himself a physician), Thabit ibn Qurra (836-901) and al-Hajjaj ibn Matar (786-833).

In the late tenth century Arabic translators played a very important role in transferring scientific and medical knowledge which was translated from Greek, Persian and Indian into Arabic, Arabic into Latin, Hebrew, Chinese and European languages. Many researchers agree that Arabic translations undertaken between the start of the Abbasid rule and the thirteenth century were highly regarded in Western Europe. Among them, Montalt and Gonzalez (2007)

state that the translations undertaken in the House of Wisdom, in turn, were translated into Latin in the eleventh century, together with commentaries added by other Arabic scholars in the intervening years. Thanks to the translation activity carried out in the House of Wisdom, the Arabs assimilated much of the Greek medical legacy and started to produce original works which contributed to the advancement of medical knowledge. Also, Vagelpohl (2010:245) argues that "*over the decades, an enormous amount of scholarly work has been devoted to the historical and literary context of the Greek-Arabic translations. Without it, we would not be able to answer vital questions about dating and translators*" Montalt and Gonzalez (2007) list some important works translated by Islamic, Christian and Jewish scholars in Spain at the school of Toledo (1125-52). These works were by Aristotle (384-322 BC), Archimedes (287-212 BC), Pythagoras (569-475 BC) and Hippocrates (460-377 BC) and were translated and commented upon by physicians such as Ibn-Rushd, also known as Averroes (1126-1198), Maimonides (1135-1204) and Ibn Sina or Avicenna (980-1037), the author of the *Canon of Medicine*.

Many scientific and medical works were made available to Western Europe in the 12th and 13th centuries in Latin translations from the Arabic (Toomer, 1990). The job of the Arabic translators at that time has also been highlighted by Montgomery (2000). He argues that between the late tenth century and the period when al-Tusi performed his sophisticated improvements on Ptolemy, two hundred and fifty years later, the vast majority of Arabic scientific knowledge passed into the Latin language and thus entered Europe. Lyons (cited in Cronin, 2012: 65) also confirms this by saying *"the immense contribution of Arab-speaking peoples through inwards and outwards translation in a bewildering variety of areas, from architecture to cartography, pharmacy, poetry, and veterinary science, is well recorded*".

Arab astronomy and science reached Latin Europe in the early twelfth century and by the thirteenth century the Arab regions started to be divided into small independent kingdoms.

Alma'ni (2000:102) states "*The Islamic civilization started to decline by the beginning of the thirteenth century when some regions became small independent kingdoms as was the case of Cordoba*."

This caused the end of the Arabic translation activity after more than two centuries of success which helped in the development of Europe at that time. Gutas (1998) believes that all the information that is currently known on this topic indicates that, after a vigorous course for over two centuries, the translation movement in Baghdad slowed down and eventually came to an end.

After the invasion of Baghdad , the Abbasid capital, by the Mongols in 1258, and the loss of Sicily and Spain, the spread of Islam was stopped. During 1516-1918, most of the Islamic world came under the military rule of the Ottomans (Masters, 2013). In the early twentieth century, the Arab world was divided into countries by the European powers and became dependent on France, England and Italy until the mid-twentieth century when most Arab countries gained their independence. In this period of dependency, many institutions, including higher education institutions, in Arab countries used foreign languages such as English and French, which curtailed the translation movements in the Arab World.

3.5.2 Modern Arabic Translation

Modern Arabic translation started in the nineteenth and twentieth centuries. As has been mentioned before (in section 3.5.1), during the 9th - 13th centuries Arabic translators played a very important role in transferring knowledge of science and medicine into Europe through Arabic translation. During the mid-20th and 21st centuries translation played the same role, but it was mainly from English, French and Italian into Arabic in order to transfer knowledge of modern science and technology into the Arab world.

The late nineteenth, twentieth and twenty first centuries witnessed a technological and scientific revolution in European countries and English is now generally used as the language of science and technology. Montgomery (2000: 255) argues that "*one of the most generally held perceptions about science today is that it has finally discovered one international language. This language, of course, is English*."

These centuries also witnessed many Arab countries gaining their independence. As a result of this, modern Arabic translation started to transfer the scientific and technological works available in English into Arabic. The era of English-Arabic translation had begun and the job of Arab researchers and translators was to transfer the knowledge of these technologies from English into Arabic. Among these translators was Rifāᶜa al-Ṯahṯāwī (born in 1802 in Ṯahṯa, Egypt; died in 1873) under the leadership of Mohammed Ali.

At that time Egypt witnessed the emergence of a veritable translation movement - the second in Arabic history (the first was that of medieval Greek translation into Arabic) - encompassing all arts and sciences and in which al-Ṯahṯāwi was both the formidable driving force and one of the principal contributors.

Most researchers agree that al-Ṯahṯāwi was the leader of the modern translation movement in the Arab world. Ibraahim (1994) argues that modern Arabic translation was first started in Egypt in the nineteenth century by al-Ṯahṯāwi. Al-Shayyāl (1951:12 (translated from the Arabic by the researcher) says that "*al- Ṯahṯāwi was educated by Shaikh al-ᶜAṯṯār who sent him to France to study languages and translation in 1826.*"

After he returned to Egypt from France, al-Ṯahṯāwi directed the newly established Madrasat al-Alsun (School of Languages) in 1835, then founded and headed the Qalam al-Tarjama (Translation Department) in 1841. Al-Ṯahṯāwi practically founded the translation movement

in Egypt. Works translated by alTahṭāwi and his pupils into Arabic and Turkish number more than two thousand[19].

This movement in English-Arabic translation started to bring new technology to the Arab world; it targeted the translation of works relating mainly to science, medicine and technology. However, the Arab translators faced the problem of finding new Arabic equivalents for huge numbers of new technical terms. As a result, many English technical terms entered Arabic and are still common in the Arab world (although most of these terms have equivalents in Arabic) such as programme, television, computer, telephone, radio, etc.

3.6 Derivation of Arabic Medical Terms

Derivation in this sense means how Arabic lexicographers and terminologists produce an Arabic equivalent for a foreign word.

Derivation is very common in Arabic lexicography and terminology. Stetkevych (1970: 7) states "*Arabic has been called the language of ishtiqāq (derivation), and this ability to grow from its own essence has given the language its rare homogeneousness*". *ishtiqāq* means to produce new terms with new lexical meanings from existing and old Arabic roots following a lexical pattern. Observe these examples:

marad مرض(disease), marĪض مريd(patient), mumarrida ممرضة(nurse), tamrĪض تمريd (nursing)

Shifā' شفاء(recovery from disease), yashfa يشفى (to get better), yushfi يشفي(to cure), mustashfā مستشفى (hospital).

Arab terminologists have followed different strategies to produce an Arabic equivalent for each foreign term. Derivation is the main strategy that they usually recommend.

Jarsis, an Arab lexicographer and a member of the Egyptian Medical Association, in his speech in a conference about arabization in April 1932, talked about unifying the translation

[19] http://weekly.ahram.org.eg/2002/568/cu1.

of medical terms into Arabic and suggested that, instead of describing what the product is, it is better to derive new equivalents from Arabic linguistic patterns such as:

Bronchitis الالتهاب الشعبي *al-iltihāb al-shuᶜabī* can be translated into Arabic as شعابا *shaᶜābā*

Hepatitis التهاب الكبد *iltihāb al-kabid* can be translated into. Arabic as كبادا *kabādā*

Endometritis التهاب الرحم *iltihāb al-rahim* could be رحاما *rahāmā* in Arabic

Nephritis التهاب الكلى *iltihāb al-kilā* can be rendered into Arabic as كلاوا *kalāwā*

(In al-Minawi, 2003)

Although derivation is a common method used by Arab lexicographers to solve the problems of neologisms, it does not work where there is no existing or old Arabic root for the new foreign term. For example, some Arabic medical terms are derived by explaining what the product is, as in:

hysterectomy استئصال الرحم *ist'isāl al-rahim*

SARS (السارس التهاب رئوي لا نمطي) *iltihāb ri'awi lānamati (al-sārs)*

or they explain the function of a product such as:

bactericidal قاتل الجراثيم *qātil al-jarāthĪm*

MRI scan, جهاز التصوير بالرنين المغناطيسي *jihāz al-taswĪr bi al-ranĪn al-maghnāṭĪsi*

Many Arabic medical terms have been derived by a word-for-word translation of foreign medical terms (direct translation). Observe the examples below:

Cancer, a Latin word meaning crab, is literally translated into Arabic as سرطان *saraṭān* (crab)

Mad Cow Disease is translated literally into Arabic as مرض جنون البقر *mara<u>d</u> <u>j</u>unūn al-baqar*,

Yellow fever is translated literally into Arabic as الحمى الصفراء *al-<u>h</u>ummā al-<u>s</u>afrā'*

Swine flu is a flu which affects swine (pigs) and can be spread to people. The equivalent for swine flu in Arabic is انفلونزا الخنازير *inflūanzā al-<u>kh</u>anāzĪr*, which is word=for-word translation.

Blood pressure: the Arabic equivalent for the term is ضغط الدم *<u>d</u>a<u>gh</u>t al-dam* which is a direct translation.

But the reasoning for the above derivations does not work with some other medical terms. Observe the following examples:

Chickenpox: although the term contains the word chicken it does not relate to chicken. It is a disease that usually occurs in children and is marked by a sparse eruption of papules (*Stedman's Medical Dictionary*, 2006: 2090). The Arabic terminologists produced the term جدري الماء *<u>j</u>udarī al-mā'* to describe this disease (see *Hitti's Pocket Medical Dictionary*, 2005:84). They may have chosen this term because the disease is characterised by small water papules spread around the skin.

Smallpox: the Arabic term for the disease is الجدري *al-<u>j</u>udarī*. The word small is not included in the Arabic equivalent term of smallpox.

Some Arabic medical terms are coined by describing symptoms and signs. For example:

Jaundice: incorporates a change of body colour and gives the white area of the eyes a yellowish tinge. In Arabic, it is called الصفير *al-<u>s</u>afīr* (to become yellow).

Hepatitis: The Arabic equivalent for it is التهاب الكبد الوبائي *iltihāb al-kabid al-wabā'i* which means inflammation of the liver.

The terms which are named after the discoverers, inventors or places are usually kept when rendering into Arabic, such as:

Down's syndrome can be rendered into Arabic as متلازمة داون *mutalāzamat dā.wan*

Mediterranean fever: the Arabic equivalent is حمى البحر الابيض المتوسط *hummā ilbahr al-ābyad al-mutawassit,* which is a literal translation. The name of the Mediterranean is still used in the Arabic equivalent.

Alzheimer's is still used in Arabic. It is transliterated into Arabic as مرض الزهايمر *marad alzahāymir.*

To sum up, Arab terminologists and lexicographers have used different methods to produce Arabic medical terms. The main method they use is derivation. When derivation cannot be used, they use description or explain the function or signs of the symptoms. They have tried to substituterender every borrowed word by an Arabic equivalent form except for those which are related to the names of persons or places. Despite efforts to coin Arabic equivalents for each foreign term, Arabic academies and institutions cannot keep up with the huge number of medical terms that enter the language every year.

3.7 Terminology and Translation

It has been made evident that specialised words are a key aspect in the translations made from English to Arabic. Arabs consider this kind of translation from the knowledge acquired from western countries significant and thus have been working on a rigorous process to accomplish complete and appropriate translations. In addition to this, Arabs are beginning to encourage their younger generations to have a good knowledge of sciences where translations

in Arabic are critical. Issues faced by young translators in the area of arabization and translation are the lack of existence of certain terms in Arabic which could make acceptable translations from English (Lataiwish, 2009).

The methodology of coining new words involves the resources of both the source and the target languages as they are the key to understanding the right meaning and then moving on to forming new terms which will adequately define the idea and the word itself in the target language.

Usually it is the job of Arab terminologists and lexicographers to create an equivalent for each new term through the Arabic academies that are spread throughout the Arab world and then they include these equivalents in English-Arabic dictionaries. Arab translators usually consult English-Arabic dictionaries and CAT tools in order to check Arabic equivalents for any ambiguous terms they come across.

3.7.1. Acronyms and Abbreviations

An acronym is a word formed from the initial letters of a group of words, whereas an abbreviation is a shortened form of a word or phrase. Richard & Hohulin (1982: 27) define an abbreviation as: "*a shortened form of a word or a phrase, but not necessarily only the initial letter or letters."* They defined an acronym as combining the initial letter or letters of each of the elements making up the complex lexical units.

Acronyms and abbreviations in Roman script are almost always written in capital letters. For example:

WHO is the acronym for the World Health Organisation.

AIBA is the abbreviation for aminoisobutyric acid (Jablonski, 2005: 22).

Acronyms and abbreviations are very common in English, especially in the medical field, and many medical terms are written as acronyms and abbreviations. Kasprowicz (2012) argues that medical English employs a great many abbreviations and acronyms. He believes that the

popularity of such shortened forms in medical language is due to the historical tradition of the language of medicine, and the economy in space and time they provide.

In Arabic there is a lack of medical abbreviations and acronyms and they are rarely used. Newmark (1988: 148) argues that "*Arabic resists most acronyms and explicates them".* Therefore, in translating acronyms and abbreviations, the Arabic translator undertakes a direct translation for each individual word. To exemplify this consider the example:

MRI is an acronym for 'magnetic resonance image' which is translated into Arabic as:

التصوير بالرنين المغناطيسي *al-taṣwīr bi al-ranīn al-maghnāṭīsī*

For common English medical acronyms, a translator may use a direct translation of the English name. For example:

AIDS (Acquired Immunodeficiency Syndrome)

is translated into Arabic as:

مرض عوز المناعة المكتسبة الايدز *maraḍ ᶜawaz al-manāᶜa al-muktasaba al-aydz*

Monolingual medical dictionaries are useful in order to check the meanings of some acronyms and abbreviations which cannot be found in bilingual dictionaries such as English-Arabic dictionaries. But there is a problem with translating acronyms and abbreviations, which is that a single term may account for different semantic references. In this regard, Byrne (2012: 51) points out:

> *"abbreviations and acronyms, which are just as specialized, and which may have a number of different meanings depends on the subject, the context or even the company or organization which produces the text."*

For instance, the acronym:

FMD

can be used to refer to:

Family Medical Doctor

طبيب الاسرة *ṭabīb al-usra*

Fibromuscular dysplasia

حثل ليفي عضلي *hathal līfī ᶜadalī*

Foot and mouth disease

مرض الفم و القدم *marad al-fam wa al-qadam*

3.7.2. Loan Words

A loan word is a word or expression which is borrowed from another language. According to Larson (1984), a loan word is a word which is from another language and is unknown to most of the speakers of the receptor language. Loan words might include names of people, geographical areas and places.

The use of names is very common in medical terminology, for example, in the names of diseases, drugs and bacteria. Also in the medical field, translators sometimes encounter new expressions and words which do not have equivalents in the TL, so they borrow the English term following the transliteration process. However, some languages have letters not present in others. For example the letter ‘p’ does not exist in Arabic and is replaced by ‘b’, also the Arabic alphabetic system does not have equivalent for the English ‘v’ which is usually replaced by ‘f’. On the other hand, some English sounds can be replaced by more than one Arabic letter, the For example the hard ‘g’ in English could be ‘ق’ or ‘ ج’ or ‘غ’in Arabic. So, in transliteration into Arabic, the word ‘Myoglobin’ could be rendered as ‘ميوغلوبين *mayūghlūbīn* or ‘ميوجلوبين *mayūjlūbīn* or ‘ ميوقلوبين *mayūqlūbīn.*

It can be seen that transliteration is not an easy process as it is difficult to borrow a word from another language without making some changes so that it can be understood by the TL reader.

3.7.3. Collocations

Collocations are very common in English especially in technical texts and specifically in the medical field. Collocations are two words or more which are grammatically linked together as a result of their meaning. According to Ghazalla (1995:108), "*collocation is defined as a combination of two or more words that usually occur together consistently in different contexts in language*."

The problem of translating collocations is that dictionaries do not often help in finding the meaning for them. But, in medical translation, it is not always difficult to find a collocation in the target language which has the same meaning as the source collocation. For instance, the English collocations:

- Bird flu
- Acute leukaemia
- Nerve cell

They can be rendered into Arabic as:

- انفلونزا الطيور *inflwanzā al-ṯuyūr*
- الابيضاضات الحادة *al-abyaḏāḏāt al-ḥādda*
- خلية اعصاب *khalīt aᶜsāb*

Baker (2011) believes that it is easy to assume that, as long as a collocation can be found in the target language which conveys the same or a similar meaning to that of the source collocation, the translator will not be confused by differences in the surface patterning between the two.

However, collocations are semantically motivated or transparent in nature. They sound convincing but are likely to distract a translator. Baker (2011) argues that translators sometimes get quite engrossed in the source text and may produce the oddest collocations in the target language for no justifiable reason.

To illustrate this point, consider the following example:

Cardiac failure

is literally translated into Arabic as "فشل القلب" *fashal al-qalb*

which means that the heart cannot do its job at all

but the appropriate equivalent is " قصور القلب" *qusūr al-qalb* (see *Hitti's Medical Dictionary*)

which means the heart cannot do its job properly.

Therefore, translators should avoid translating source language collocations literally when the collocational patterns are untypical of the target language.

3.7.4. Compounds

Compounds are terms that include more than one word or element to give a new meaning independent of the constituent components. Katamaba (1993: 219) defines a compound as *"a word made up of at least two bases which can occur elsewhere as independent words"* . Compounds are distinguished from other combinations, like phrases, collocations and idioms, in having an idiomatic meaning that, in some cases, cannot be derived from its components. This can be illustrated by a medical term such as *chickenpox* جدري الماء او الحماق where two words are concatenated, chicken and pox, to make a separate lexeme. *Chickenpox* is not related to chicken at all. On the other hand, some compounds consist of words or elements that can help to determine the whole meaning of the compound such as *photoelectric*

كهروضوئي, *photo-allergy* حساسية للضوء, *hospital-acquired infections* عدوى مكتسبة من المستشفيات.

Each of the words or elements of the compound belongs to one of the syntactic classes: noun, preposition, verb, adverb, or adjective.

3.8. Equivalence Problems in Medical Translation

Medical terms cause the most problems in translating medical texts and the more medical terms that appear in the source text, the more problems arise in translating the lexical items into the target text. In this situation, translators usually use bilingual medical dictionaries but these are often not updated in the target language and this, in turn, may affect the translation. So a translator will think about the notion of equivalence which is one of the main features of translation study. Vinay and Dabelnet (cited in Cronin2003: 121) describe equivalence as *"the process of replacing elements in the ST with corresponding elements in the TT so as to replicate the same situation as in the original whilst using completely different wording."*. Equivalence refers to the relationship between two texts: a source text (ST) and a target text (TT). A translator's failure to achieve an appropriate equivalent translation can result in a mistranslation which may be misleading in most fields but which can be fatal in the field of medicine (Baker and Saldanha, 2009). Problems of equivalence occur at various levels, ranging from word to the textual level.

3.8.1 Grammatical Equivalence

Grammatical rules vary across languages. Each language has its own grammatical rules which pose some problems in terms of finding a direct correspondence in the TL. Baker (2011: 88) states:

> "*Grammar is the set of rules which determine the way in which units such as words and phrases can be combined in a language and the kind of information which has to be made regularly explicit in utterances."*

In this respect, the information in a text should be organised and linked by grammatical rules in order to be understood and a translator should be aware of these grammatical rules in both the SL and the TL. Having a knowledge of the grammatical structures in the SL and in the TL is very important for the translator to be able to produce an accurate translation. Baker (2011) argues that grammar is organized along two main dimensions: morphology and syntax. Morphology covers the structure of words and the ways in which the form of a word changes to indicate specific contrasts in the grammatical system. Syntax covers the grammatical structure of groups, clauses and sentences.

A translator should bear in mind the different aspects of grammar in the SL and in the TL. Baker (2011) states that, unlike the Arabic grammatical system, the English system makes very few distinctions in terms of number, gender and verb agreement.

For example, in English, there are few distinctions between masculine and feminine. Consider the following examples:

The word 'patient' can be translated into Arabic as مريض *marīḍ* (masculine) or مريضة *marīḍa* (feminine).

The word 'child' can be rendered into Arabic as طفلة *ṭifla* (feminine) or طفل *ṭifl* (masculine).

So, the following sentence could be translated into Arabic in two ways, in regard with the word 'patient':

"The patient will need an operation within the next two weeks."

Can be translated as:

يحتاج المريض الى عملية جراحية في خلال الاسبوعين القادمين (masculine)

yaḥtāj al-marīḍ ila ʿamaliyya jirāḥiyya fi khilāl al-usbūʿayn al-qādimayn

Or as:

تختاج المريضة الى عملية جراحية في خلال الاسبوعين القادمين (feminine)

taḥtāj al-marĪḍa ilā ᶜamaliyya jirāhiyya fi khilāl al-usbūᶜayn al-qādimayn

In this situation, if the context is not helpful for arriving at the correct choice, the translator may use both translations separated by a slash as:

تحتاج المريضة \ المريض الى عملية جراحية في خلال الاسبوعين القادمين

taḥtāj al-marĪḍa / al-marĪḍ ilā ᶜamaliyya jirāhiyya fi khilāl al-usbūᶜayn al-qādimayn

English uses singular and plural forms, whereas Arabic uses singular, plural and dual forms which affect the form of the sentence. For example:

The affected finger

الاصبع المصاب *al-iṣbaᶜ al-muṣāb* (singular)

The affected fingers

could be

الاصبعان المصابان *al-iṣbaᶜān al-muṣābān* (dual)

Or

الاصابع المصابه *al-aṣābiᶜ al-musāba* (plural)

The meaning depends on the context of the situation and any choice affects the use of other sentences' components such as verbs, adjectives, etc.

3.8.2 Cultural Equivalence

Culture means the manners that are favoured by a certain group of people in a certain place in the world and their way of living, including their society, ethics symbols, customs, values, daily activities, ways of thinking, geography, history, science and arts. Their manners and way of living can have an impact on their language. Hence, translation involves not only a movement between SL and TL but also between their cultures**.** Faiq (2000: 1) states:

> "*Culture refers to beliefs and value systems tacitly assumed to be collectively shared by particular social groups and to the positions taken by producers and receivers of texts, including translations, during the mediation process*."

Within this framework, a language is intrinsically linked to its culture and translation can thus be used to describe and explain the world views of one people to another (Alma'ni, 2000). On the other hand, a language is influenced by its culture. So a translator should have background knowledge of both the language and culture of the SL and the TL. Many English words do not have an equivalent in Arabic because they do not exist in Arabic culture; for example an expression like 'partner' does not exist in Arabic culture and can be translated into Arabic only as زوج *zawj* which means husband. In English culture, there is a difference between using these expressions (partner and husband) as husband refers to the married man, but partner usually refers to one of a couple who live together without marrying. Also sometimes a translator needs to use the opposite meaning to translate a sentence from English into Arabic so to be understood by the TL reader in the same way that the SL reader understands it. For example:

You warm my heart

can be translated into Arabic as:

اثلجت قلبي

athlajta qalbī

which literally means:

You cooled my heart

This expression is used in both cultures, when one hears good news that one is waiting for. But in Arabic the word 'cool' is used instead of 'warm'. Perhaps the Arabs prefer 'cool' as they live in hot countries, while the English prefer 'warm' as they live in a cold country.

In this regard, the translator needs to have a cultural awareness of both languages and be aware of the cultural differences between the SL and the TL.

Cultural gaps between Arabic and English are inevitable and cannot be easily bridged especially when translating literature such as novels and poems. In the medical field, culture does not affect translation too much and it is more important for the translator to have a knowledge of the subject matter and of medical terminology than a knowledge of culture of the SL and the TL.

3.9. The Problem of Non-equivalence

As is self-evident, all languages are different, and this makes it hard to find appropriate equivalents for some words or concepts in the target languages. An Arabic translator sometimes faces the problem of finding lexical equivalents for English words, objects and events in Arabic. Baker (2011: 23) states *"non-equivalence at word level means that the target language has no direct equivalents for a word which occurs in the source text*." Many English words and concepts have no equivalents in Arabic and vice versa.

Accordingly, Baker (2011) writes about the common problems of non-equivalence which can be summarised as:

1. Culture-specific concepts

The source language word may express a concept which is totally unknown in the target culture. Culture usually relates to religious beliefs, social customs, types of food or way of life.

England, as a developed country, has many national institutions, organisations and services working in the medical field which are not found in Arabic countries; thus they do not exist in the Arabic language and it is hard to find their equivalents in Arabic. 'Adaptation services', for example, refers to the services provided by a team, one of whose jobs is to check and assess if a house is suitable for disabled people and to provide the house with facilities to meet the disability. In Arabic there is no equivalent for this concept.

2. The source-language concept is not lexicalized in the target language

The source language word may express a concept which is known in the target culture but simply not lexicalized, that is it is not 'allocated' a target-language word to express it. Toothache is a pain in a tooth resulting from infection or trauma. Arabic has no equivalent for it, although it is a very common symptom. It could be rendered into Arabic by using the explanation 'الم بالاسنان و اللثة' *alam bi al-asnān wa al-laththa*

3. The source-language word is semantically complex

This is very common in translation. A single word which consists of a single morpheme can sometimes express a more complex set of meanings than a whole sentence. For example, 'dialysis' (which is a Greek word *dialusis* meaning separating, dissolution, derived from *dialein*, *dia-*, apart + *lein*, to loosen) means 'filtration to separate crystalloid from colloid substances in a solution by interposing a semi-permeable membrane between the solution and dialyzing fluid; the crystalloid (smaller) substances pass through the membrane into the dialyzing fluid on the other side, the colloids do not.' (*Stedman's Medical Dictionary*,

2006:532) This method is used for patients with kidney failure. Although dialysis is a very common process, in Arabic there is no equivalent for dialysis and it is usually transliterated as daylaza ديلزة *daīlaza.*

4. The source and target languages make different distinctions in meaning

The target language may make more or fewer distinctions in meaning than the source language. What one language regards as an important distinction in meaning another language may not perceive as relevant. In English there is usually a difference between clinic, surgery (GP) and an outpatients' department but in Arabic there is usually no difference. All of these could be translated as *ᶜiyāda* عيادة

5. The target language lacks a superordinate

The target language may have specific words (hyponyms) but no general word (hyperonym) to head the semantic field. For example, 'gonad' is a term used in English to refer to a gland that produces gametes and hormones: the ovary in the female and the testis in the male (Mostafa et al, 2007). In Arabic there is no ready equivalent for gonad, however, مبيض *mubiyad* is used as an equivalent for ovary and خصية *khasiyya* for testis.

6. The target language lacks a specific term (hyponym)

More commonly, languages tend to have general words (hyperonyms) but lack specific ones (hyponyms), since each language makes only those distinctions in meaning which seem relevant to its particular environment. For example, 'orthoptist' and 'ophthalmologist' are the names of eye specialists who do different jobs relating to eye treatments. In Arabic there is no equivalent for each of these specific specialists. Eye doctor طبيب عيون *ṭabīb ᶜuyūn,* which is a general expression, is used as an equivalent for both.

7. Differences in expressive meaning

There may be a target-language word which has the same propositional meaning as the source-language word, but it may have a different expressive meaning. The difference may be considerable or it may be subtle but important enough to pose a translation problem in a given context. For example, in English there is a difference between ‘snow’ and ‘ice’, but in

Arabic there is no difference, ثلج *thalj* is used as an equivalent for the words snow and ice.

8. Differences in form

There is often no equivalent in the target language for a particular form in the source text. Certain suffixes and prefixes which convey prepositional and other types of meaning in English often have no direct equivalents in other languages.

Many English medical terms contain prefixes, roots or suffixes (as was discussed above) which carry meaning and have no equivalent in Arabic and thus are usually replaced by appropriate paraphrases. There are many examples in the medical field such as *mitochondria* in '*mitochondria*l *myoma'* is ‘the principle energy source of the cell’ (see *Stedman’s Medical Dictionary*, 2006:1215) and *myoma* means weakness of the muscles, thus *mitochondria myoma* means weakness of the muscles due to deletion or duplication of the energy producer in the cell ‘mitochondria’.

9. The use of loan words in the source text

The use of loan words in the source text poses a special problem in translation.

Many medical terms are complex and hard to be understood by the English native reader, let alone by the target language reader, because they have been borrowed from other languages. Loan words can be found in all medical fields such as canthus, capsulotomy, hypermetropia and many more. Baker (2011) gives a clear example to explain the problem of loan words in the source language. She says *that* dilettante is a loan word in English, Russian and Japanese

but Arabic has no equivalent loan word. This means that only the propositional meaning of dilettante can be rendered into Arabic. Its stylistic effect would almost certainly have to be sacrificed.

To tackle the problem of non-equivalence, the translator should clearly understand the meaning of the word/words in the context of the source language before he/she starts the process of translation. Baker (2011: 25) remarks that different kinds of non-equivalence require different strategies. She adds "*... in addition to the nature of non-equivalence, the context and purpose of translation will often rule out some strategies and favour others*". She (2011) illustrates some strategies used by professional translators for dealing with non-equivalence problems which can be summarized as:

1. Translation by a more general word (superordinate)

This is one of the commonest strategies for dealing with many types of non-equivalence.

This means using a general word instead of a specific word which has no equivalent in the target language. For instance, there are more than a hundred types of blood tests, the most common of which are: A complete blood count (CBC), Blood chemistry tests[20], Blood enzyme tests, Blood tests to assess heart disease risk and Blood clotting test. All of these can be rendered into Arabic as تحليل دم *ta<u>h</u>līl dam* which literally means blood test in English.

2. Translation by a more neutral/less expressive word

For example, the word 'died' in this sentence:

The patient died two hours ago

can be translated into Arabic as توفي *tuwuffiya* which is the equivalent for 'passed away'.

[20] See http://www.nhlbi.nih.gov/health/healthhttp

Although there is an equivalent for 'died' in Arabic which is مات *māt* , the word *tuwuffiya* توفي is more formal and often used when Arabs talk about human beings.

3. Translation by cultural substitution

This strategy involves replacing a culture-specific item or expression with a target-language item which does not have the same propositional meaning but is likely to have a similar impact on the target reader. For example, single mum cannot be translated into Arabic as ام عزباء *umm ᶜazbā*' as this expression does not exist in Arabic culture. It can be rendered into Arabic as ام لطفل غير شرعي *umm li tifl ghair sharᶜī* . Another example is the term midwife meaning a specialist nurse looking after pregnant women. In most Arab countries they do not provide this service for pregnant women. *Midwife* cannot be translated literally into Arabic. So, it is rendered into Arabic as *al-dāya* الدايهor القابلة *al-qābila* (see *Al- Mawrid Dictionary*, 2000: 578) which is a nurse who helps pregnant women at the time of delivering their baby which is one of the jobs of a midwife in England.

4. Translation using a loan word or loan word plus explanation

This strategy is particularly common in dealing with culture-specific items, modern concepts and buzz words. For instance, decibel can be translated into Arabic as:

ديسبل و هو وحدة قياس السمع *dīsabil wa huwa wahdat qiyās al-samᶜ*

5. Translation by paraphrase using a related word

This strategy tends to be used when the concept expressed by the source item is lexicalized in the target language but in a different form. 'Decholesterolization', for example, is rendered into Arabic as نزع الكوليسترول *nazᶜ al-kūlīstrūl*

6. Translation by paraphrase using unrelated words

This strategy is used in some contexts if the concept in the source text is not lexicalized in the target language. For example, myomatectomy can be translated into Arabic as:

استئصال الورم العضلي *isti'sāl al-waram al-ᶜadalI*

7. Translation by omission

Translation by omission is to omit translating a word or expression [in some contexts]. If the meaning conveyed by a particular item or expression is not vital enough to the context of the text, the translator can simply omit [translating] the word or expression (Baker, 2011).

For example,

African tick-bite fever could be rendered into Arabic as الحمى الافريقية *al-hummā al-ifrīqiyya* which literally means African fever, so the element tick-bite is not included in the translation but the translation is still regarded as correct.

The translator should be very careful when deciding to omit a non-vital word and should never omit medical terms within the text.

8. Translating by illustration

Translation by illustration means giving an example or drawing a picture to show the meaning of the term. It is used if a word which lacks an equivalent in the target language refers to a physical entity which can be illustrated, particularly if there are restrictions on space and if the text has to remain short, concise and to the point (Baker, 2011). This strategy is used in some bilingual medical dictionaries when there is no equivalent for the term and it is hard to explain, thus illustration can be very useful.

Most of the above common problems of non-equivalence mentioned by Baker (2011) are common in medical translation. These strategies are commonly used by translators but they

should be very careful when using explanation and paraphrasing as medicine is a very sensitive subject.

Adding to the above problems, in medical translation, some terms are named after an inventor or the discoverer of a disease. For example, Down's syndrome, named after the scientist who discovered the disease, can be translated as متلازمة داون *mutalāzimat dāwan*. The name is kept as one cannot translate the names of people.

3.10. The Problem of Neologisms

Neologism means a new word or a new concept in a particular language. Neologisms were defined by Montalt and Gonzalez (2007) as new terms used to represent and transmit new concepts. They are the result of what is referred to as the process of terminologizing new medical knowledge. They can be either newly formed words or existing words to which new meanings are attached.

Neologisms can be considered as a problem in the source language as the author needs to coin a new word or expression. On the other hand, a translator also faces the problem of finding an equivalent for the new word or expression as they have not got ready equivalents in the TL and they will not yet be available in dictionaries. Accordingly, Montalt and Gonzalez (2007) argue that medical translators have two types of challenges. On the one hand, understanding the meaning of the English term in the source text and, on the other hand, finding an equivalent term in the target language.

One of the signs of the technological progress and development of any scientific activity is the emergence and development of a set of technical and scientific terms that represent the key ideas within that scientific activity and development. As rapid developments and progress in technology take place, especially in the medical field, new diseases are

discovered and new medicines and equipment are invented. These need to be named in the source language and they also need equivalents for them to be formed in the target language.

Accordingly, Montalt and Gonzalez (2007: 230) state:

> *"As new diseases appear and biomedical research advances, new knowledge is generated, which has to be conceptualized and transmitted. Thus, the purpose of terminologizing medical knowledge is to organize it, store it and make it available for communication."*

Neologisms are very common in medical terminology particularly for the names of diseases as they spread very quickly throughout the world and each language needs to have equivalents for them very quickly. In some cases functional-descriptive terms are used to name new diseases, for example 'swine flu' first became an epidemic in 2009. It started in Mexico and spread very quickly throughout the world. The disease mainly spread from pigs (swine) to humans. The affected people had similar symptoms to seasonal flu[21] so it was easy to find an equivalent in Arabic for it using a literal translation. But the problem is that the virus is new and it is named in the source language, which is English, as H1N1 which is a formula which has no equivalent in Arabic. In this case the English word is adopted.

Newmark (1988: 143) recommends some ways for dealing with neologisms. He states:

> *"Any kind of neologism should be recreated; if it is a derived word it should be replaced by the same or equivalent morphemes; if it is also phonaesthetic, it should be given phonemes producing an analogous sound–effect."*

When an Arabic translator of a medical text comes across a neologism in the source language, which is usually written in English, s/he has to look for an appropriate equivalent. If s/he cannot find any equivalent giving a definition will be the last solution.

[21] http://www.nhs.uk/conditions/pandemic-flu/pages/intrudtioin.aspx

3. 11. Polysemy

A polyseme is a word with several different or closely related meanings. For example, treatment, remedy, therapy can be translated into Arabic as علاج *ᶜilāj*. On the other hand, an English word could have more than one equivalent in Arabic; for example, the word mucus can be translated into Arabic as: نخامة *nukhāma* , صديد *ṣadīd* , قيح *qayh*

Related to the difficulties of polysemy, the translator may face the problem of a word which has more than one meaning which are completely different in the SL and in the TL such as 'drug' which can mean 'medicine' or 'an illegal substance such as heroin, hashish' and which can be translated into Arabic as دواء *dawā'* (medicine) or مخدر *mukhaddir* (illegal substance). In this situation choosing an inappropriate equivalent in the TL can cause serious problems particularly in sensitive fields, such as medicine. Here the translator relies on the context of the situation and should be aware of what the translation is about.

For instance:

The doctor advised his patient:

"It is better to take this drug in time."

can be translated into Arabic as:

من الافضل ان تأخذ هذا الدواء في الموعد

min al-afḍal an ta'khudh hādhā al-dawā' fi al-mawᶜid

In the above sentence the word 'drug' was translated as if it were 'medicine'.

Also, it can be translated into Arabic as:

من الافضل ان تأخذ هذا المخذر في الموعد

min al-afḏal an ta'khuḏh hāḏhā al- mukhaddir fi al-mawᶜid

In the above sentence the word 'drug' was translated as 'illegal substance'.

Thus the first sentence is the appropriate translation which gives the equivalent of 'medicine' for the term 'drug'. A translator should know doctors never advise their patients to take illegal substances. The same principle applies when one translates the word "pupil" which can be rendered into Arabic as تلميذ *tilmĪḏh* or حدقة العين *ḥadaqat al-ᶜayn*. Also, the word patient can be translated into Arabic as صبور *ṣabūr* or مريض *marĪd*

Also, some acronyms and abbreviations can present a problem of polysemy, as they are not unique and some abbreviations or acronyms can have different meanings. Navarro (2005) claims that abbreviations and acronyms are sources of polysemy. According to him, the abbreviation CF can have at least 15 meanings: calibration factor, cancer free, cardiac failure, chemotactic factor, Chiari-frommel, chick fibroblast, Christmas factor, citrovorum factor, clotting factor, colony factor, complement fixation, contractile force, coronary flow and cystic fibrosis.

Nevertheless, polysemy can express the association of one word with one of its more distinct meanings. Mere dependence on the text is not sufficient. The context of the situation is very important in determining the appropriate equivalent for the term involved. In some cases, seeking advice from a consultant by a translator is the last option especially when one faces a problem of having more than one meaning for an English term and they are all related to a similar subject matter. For example, *GP* has two different meanings in medicine. It can mean *General practitioner* or *General Psychiatrist.*

3.12. Terminological Inconsistency in Medical Translation into Arabic

Inconsistency in medical translation means having different Arabic words for the same English medical term. This may happen due to the individual works of different Arabic academies and institutions in the Arab world. Accordingly Sieny (1985: 155) argues that "*there are many official and unofficial agencies involved in producing Arabic scientific terminology, the matter that leads to the common problem of multiplicity of terms*". Many English-Arabic medical dictionaries have been compiled in different Arab countries and each compiler follows his/her country's academy. Different medical dictionaries may have different meanings for the same English term. Also, different meanings for the same English term may be found in one medical dictionary. This can be noted in many medical terms, such as: diet, حمية (in *Hitti's Medical Dictionary*: 124) or نظام غذائي (in the *UMD*), angina خناق او ذبحة صدرية (*Hitti's Medical Dictionary*: 28) , pancreas المعثكلة او البنكرياس prostate البروستاتا او المؤثة asthma ازما او ربو tuberculosis السل او الدرن .

The problem of inconsistency can only be resolved by standardisation. Haddad (cited in Yaseen, 2013) and Al- Quran (2011) recommend standardizing medical terms as a necessary procedure in medical books and dictionaries.

3.13. Strategies for Solving the Problems of Equivalence

Baker (2011) suggests tackling the multifarious problems of equivalence through a very 'bottom up' approach beginning with simple words and phrases before moving into intricacies.

Issues with equivalence are encountered at several stages which generally range from a term to other levels of text-based documents. These issues usually come about due to lexical and grammatical dissimilarities and different cultures in the language of the source document (SL) as compared to the language into which it is to be translated (TL). All these issues are interlinked with each other. Meanings of words can differ from culture to culture and can

sometimes be understood only via the context of the usage of the word. Due to the above mentioned issues, it is quite often the case that translation can incorporate a combination of both loss of information and added data. Hence, the challenge is one of dealing with lost and added data during the process of translation (Basnnett, 1991). Studies have pointed out that the realistic situation is that information is lost and gained during translation and that all translation usually involves this issue of data being lost and added along with the distortion of data.

3.13.1 Addition of Information

Information that is not part of the original data can be added to the translated data in the TL. It is often seen that added data is generally based on the cultural, semantic or even technical aspects of the data. These are denoted either within brackets or as footnotes. The purpose of adding some information in the TLT is that the reader of the TLT can then understand the message in the SLT as it is understood by the SLT reader. For example, 'speech and language therapist' is a medical specialist and can be translated into Arabic by adding some information as اخصائي علاج النطق و البلع *ikhsā'ī ᶜilāj al-nuṭq wa al-balaᶜ* as the role of a speech and language therapist (SLT) is to assess and treat speech, language and communication problems in people of all ages to enable them to communicate to the best of their ability. They may also work with people who have eating and swallowing problems[22]. Adding an explanation to the SL term is sometimes needed so that the TL reader can understand. This strategy is usually used when there is no equivalent for the SL word, abbreviation, expression and event in the TL. For example, NHS can be translated into Arabic as خدمات الصحة المحلية ببريطانيا *khadamāt al-sihha al-mahalliyya bi-brīṭānyā.* The country's name, England, has been added to the translation in order to make clear to the reader that this abbreviation relates to the health service in England.

[22] Seehttp://www.nhscareers.nhs.uk

3.13.2 Deletion (Omission) of Information

Omission is used to avoid repetitiveness, awkwardness and redundancy in some situations. However, the omission of a translated word does not always really make a difference as the idea that is to be expressed is brought about by the context itself. This is generally done when there are certain words which do not bring out the exact meaning as that of the source data and would have to be supported by long explanations in order to make the receptors understand the text well. Hence, instead of this tedious process, deletion is permissible provided that the essence of the statement is kept the same (Baker, 2011). Sometimes deletion that pertains to modifiers and relates to content rather than structure is possible in translating academic texts. It is recommended that translators go through their translations as if they were readers and then they should delete anything that mightmake their translation or the transfer of the original text less understood. For example, bovine spongiform encephalopathy (Cow Mad Deseas) can be translated into Arabic as اعتلال الدماغ عند البقر *iᶜtilāl al-dimāgh ᶜind al-baqar* which means in English bovine encephopathy, the element spongiform being omitted in Arabic translation.

3.13.3 Structural Adjustment

Structural adjustment is one way of achieving equivalence through bringing about a change from the SL to the TL grammatically. Hence, structural adjustment becomes synonymous with alternation, transposition or shift (Newmark, 1988).

Some linguists believe that the mere moving from one language to another alters the forms and structure of the context. This means a change in classes of words, their order or even their categories. Structural adjustment helps in delivering proper stylistic equivalence which, in turn, helps in developing equivalent structures semantically and in adjusting the way the

message is tuned to the needs of the structure of the receptor language. It also aids in bringing an equivalent communication load (Nida, 1964).

Newmark (1988) also suggests that the shift of forms may be divided into four different classifications. The first shift is one which is needed in the scenario of a SL grammatical structure not being there in the TL. An example would be that of the English language and the tendency to put in words like 'however', 'furthermore' etc. at or near the beginning of a sentence. The second shift is the change that can be made with regard to the position of an adjective or from singular to plural. A third type of shift is that of using the grammatical structure to account for a lexical gap that is present. The fourth and final type of shift is a case in which there is a possibility of a literal translation grammatically yet it may not fit in well with the proper usage in the TL. Furthermore, there are alterations in the classes of words (which entail a movement from word level to clause or phrase level or from one class to another) and these are significant due to the differences in grammar between the target language and the source language.

3.14. The Methods Used in Translating Medical Terms into Arabic

Since foreign discoveries need to be named in Arabic in order to be read and understood by Arabic speakers, Arab terminologists try to produce and give names for each foreign medical term. Moreover, Arabic translators are involved in finding suitable Arabic terms equivalent to the terms created by Arab terminologists for each given foreign term to be understood by Arabic readers.

The need to translate medical terminology into Arabic stems from the fact that the medical field in Arabic countries is dominated by the English language. The language used in the study of medicine is either English or French. Thus, in the practice of medicine, medical

diagnoses, progress reports, prescriptions etc. are all written in either English or French, not Arabic.

Attempts have been made to make medical texts originally coined in a foreign language appear in Arabic. Arab terminologists and lexicographers are or have been worried that Arabic might be badly left behind. They have made many efforts to deal with this issue. Thy established many institutions to deal with the issues of translations and arabization (see chapter two).

The following are three methods used by Arabic translators to translate English medical terms into Arabic:

3.14.1. Translation

Translation within the remit of this study is the replacement of an English term with a correct Arabic term that has the same meaning in both languages. A great number of medical terms are translated into Arabic equivalents which are part and parcel of Arabic language stock. Many of these terms can be checked in English-Arabic medical dictionaries. Consider the following examples of translation:

Measles: الحصبة *al-ḥaṣba*

Diarrhoea: الاسهال *al-ishāl*

Asthma: الربو *al-rabw*

Diabetes: مرض السكري *marad al-sukkarī*

Tuberculosis (TB): مرض السل *marad al-sull*

But the replacement of English word by an Arabic word may lead to literal translation. Literal translation is a direct translation which involves word for word translation. It is common in technical translation in general and specifically in medical translation. Cardos de Camargo

(cited in Cronin 2003: 119) shows that *"literal translation is actually one of the most frequently used translation strategies in technical text*." Translating medical terms literally into Arabic may give acceptable translations in many cases, especially in translating medical terms which consist of one word such as eye عين , influenza بردة , cancer سرطان , patient مريض . It also may work in translating some medical compounds, collocations and abbreviations. Consider the following example:

Epididymo-orchitis التهاب البربخ و الخصية

ENT department قسم اذن انف و حنجرة

Skin diseases امراض الجلد

On the other hand, literal translation may not work in rendering some medical terms into Arabi , especially some compounds and collocations, e.g. *hay fever* is not translated literally as a kind of fever in Arabic. It is rendered as حساسية الربيع *hassāsiyyt al-rabīᶜ* which literally means spring allergy, as it usually appears in spring.

It follows that medical translation is guided by certain strategies relating to the systemic differences between the two languages concerned and the type of language used in any individual text. Such strategies are applicable in translating medical terms into Arabic.

To sum up, 'translation' in this study means the transmission of medical terms into Arabic, using words that already exist in the Arabic language and which give the same meaning as that in the SL. In this method of translation only Arabic words are used.

3.14.2 Transliteration

The phonetic transcription from a source language of a word by the usage of differing script is called transliteration. To transliterate is to write a letter or word using the closest

corresponding letters of a different alphabet or language (*Compact Oxford English Dictionary*, 2008:1101).

In short, it is a letter for letter exchange. There are many examples in the medical field:

Bacteria بكتيريا *baktīryā*

Malaria مالاريا *malāryā*

Bilharzia بلهارسيا *bilhārsyā*

Mattlūb (1983) calls this method الذخيلة al -*dakhīla*. He sees it as a useful method and believes that it is sometimes necessary to include this method in Arabic, as in the case of foreign names and pharmaceutical items and labels. However, Ghazalla (1995) calls this method of translation a poor method. He argues that in this case, transcription is the poorest and worst method of translation, for it means to open the door widely to allow foreign words to invade the Arabic language. Therefore, it has to be avoided by all means by students, except in two cases:

- When the foreign term has not been given an Arabic equivalent yet e.g. vitamin فيتامين *fī tāmīn* , radar رادار *rādār.* In such a case, it can be used temporarily until it is given an Arabic equivalent. This is what should have happened to words like:

  Computer كومبيوتر \ حاسوب *kūmbyūtar* / *hāsūb*

  Virus فيروس \ جرثومة مغذية *fayrūs* / *jarthūma mughadhdhiya*

- In the case of foreign names such as the names of inventors.

Pinchuck (1977) raises the problem of sounds when transliterating some words into Arabic. He points out that transliteration is to reproduce letter by letter, not to reproduce pronunciation. He states that transliteration is not an easy process since some languages

have letters not present in others. In Arabic, for example, there are three equivalents of the sound “g” which are “ج“ , ”غ” and “ق”. Additionally, the transliteration of the /p/ into Arabic would pose a problem as this sound does not exist in Arabic;

for example:

اسبيرين *āsbīrīn* is a loan word (Aspirin), a name of a medicine. The problem appears first with the pronunciation of the /p/, and then with any back transliterations into English as it can be easily be represented as /b/ rather than /p/.

Also, there is no difference between the sounds /f/ and /v/ in Arabic; they are both replaced by letter “ف”, the sounds /w/, /u/ and /o/ can be changed only into the “و” sound in Arabic and the sounds /y/ and /i/ can be replaced by “ي” in Arabic.

Transliteration is common in the medical field and most transliterated terms have been adopted in Arabic although some of them have an equivalent in Arabic such as:

Cholera كوليرا *kūlīrā*

It has an Arabic equivalent: الهيضاء *al-hīḏā'*

But كوليرا kūlīrā still exists in Arabic and is commonly used.

pancreas بنكرياس *binkarīyās*

Although المعثكلة *al-muᶜthakila* is an Arabic equivalent for pancreas , the transliteration of the term, بنكرياس *binkarīyās,* is commonly used in Arabic.

Arabic translators may tend to use transliteration for various reasons:

- Some medical terms are names of persons, formula or places and the names cannot be translated into Arabic.

- They may rely on transliteration when they cannot find an Arabic equivalent for the foreign term.

To avoid this problem, Baker (2011) argues that it is useful to add an explanation to loan words when they are unfamiliar to the TL reader. This would be either by explaining what the product is, as in:

> The word schizophrenia could be translated as " مرض انفصام الشخصية الشيزوفرينيا" *marad infisām al-shakhsiyya al-shīzūfrīniyā*
>
> The word Myoglobin could be rendered into Arabic as " الصبغ البروتيني الميوغلوبين" *al-sabagh al-brūtīnī al-mīyūghlūbīn*

or by explaining the function of the product, as in:

> Tyrocidin could be translated as " المادة المضادة للجراثيم الثيروسيدين" *al-mādda al-mudādda lil-jarāthim al-tīrūsīdīn*

By adding an explanation to the transliterated term, it will be easier for the TL reader to understand the intended meaning of the term.

3.14.3 Arabization

The term arabization or التعريب *al-taᶜrīb* appeared during the Islamic caliphate during the eighth century (Abbasid rule) to mean different things all of which are related to Arabic. It means:

- The teaching of Arabic to non-Arabs.
- The fluency gained in Arabic by a non-Arab.

•The inclusion of foreign words and concepts into Arabic having undergone some phonological and structural charges in accordance with Arabic language rules (Al-ᶜisawi, 1996).

Badawi (cited in Al-Ma'ni, 2000: 110) agrees with Al-ᶜisawi and says "*arabization is an attempt to transfer a word or a term from a foreign language into Arabic with no changes being made except for any change to pronunciation to suit the sound system of Arabic.*"

Haashim (1988: 38) sees arabization "*as the use of Arabic as the language of thought, education, science and communication."*

The first attempt at the arabization of medical terms in the Arab world was in Damascus University in Syria in 1919. Later, the issue of using Arabic in medical institutions in the Arab world was discussed in many conferences. One of them was in April 1932 in Egypt at a conference organized by Arabic academies (Al-minawi, 2003).

El-Magrab (2011) has a different definition for arabization and makes a comparison between arabization and arabicization. He argues:

> *"There are two phrases which are often used interchangeably – these being arabization and arabicization. An analysis was done as to what each of these really meant and what was their significance. It was seen through research that arabization referred to the local people while arabicization had a direct connection to the language; newer terms were introduced within the language by closely understanding the meaning of the words in the other languages. This eventually led to the fast growth of the language along with the influence of modern trends, where foreign terms were translated into Arabic, using its Arab forms. This method was also known as the adoption process of giving way to newer words into the language.*"

However, Mattlūb (1983:29) defines arabization as *"the writing of foreign words in Arabic orthography".* Similar to Mattlūb's definition of arabization, Ghazalla (1995:165) calls this

method "naturalization". He states "*it is to take the English term and adapt it to Arabic alphabet and grammar, by changing one or two of its letters into Arabic ones, and having singular, plural, masculine, feminine or verb forms of it*".

Examples:

Biological (adjective) بيولوجي *bīyūLūji*

Biologist (noun) بيولوجي \ اخصائي بيلوجيا *bīyūLūji / ikhsā'ī baūūLūjīa*

Biologists (noun/plural) بيولوجيون \ بيولوجيات *bīyūLūjiyyūn / baūūLūjīāt*

Biologically (adverb) بيولوجياً *baūūLwjiyan*

So, arabization (in the current study) means that a foreign term is adopted and formed to suit Arabic pronunciation and grammar. This can be seen from the above examples.

There is some debate between Arabic scholars about using arabization when translating terms into Arabic. Ghazalla (1995:166) argues:

> *"although naturalization "arabization" is a step further toward translation into Arabic, it is not satisfactory, because the foreign term exists still mainly as it is without an Arabic equivalent. Therefore it may be not understood except by a specialist. Some Arabs do not understand,كيميائي kīmīyā'iī, بيولوجي baūūLwji"*

This means that Ghazalla believes that by using arabization a translation has not been achieved in an acceptable way.

On the other hand, in the researcher's personal communication with Professor Khashīm, the Head of the Arabic Academy in Libya (1994- 2011), he stated that "i*f there is no Arabic equivalent for the foreign term in this case, it can be used after adapting it to Arabic alphabet and grammar*". In this regard, Mattlub (1983:36) wrote "... *being subject to Arabic rules of*

grammar, phonology and rhythm, it has thus become Arabic in spirit and structure to the extent that the hearer would not suspect its foreign origin".

Khalifa (1987) agrees with Khashīm's opinion. He regards arabization as the last resort in coining Arabic terms from foreign sources.

According to Al-Jalabi (1984), Arab lexicographers are divided into two groups when it comes to the process of arabization:

1. Those who prefer to derive new equivalent terms from classical Arabic linguistic patterns or by semantic extensions of older expressions.

2. Those who ask for the translation of all foreign terms, and the replacement of all borrowed words with equivalent ones.

But, with the huge number of new scientific and technical terms, those Arab lexicographers in group (2) are obliged to accept the borrowing of foreign terms (i.e. the transliteration of the term, see 3.14.2) until they can coin equivalents for them in Arabic, which usually takes time, e.g: Internet, Ipad, Skype. Sieny (1987) notes the absence of an official terminological body and the slow progress of official agencies in producing Arabic terms for thousands of new concepts that enter the language every year.

In order to analyse the effects of arabicization and the existence of terms, El-Magrab (2011) writes that Arabic words should make use of their phonotactics (the area of phonology concerned with the analysis and description of the permitted sound sequences of a language)[23]; if they do not do this they are considered to be borrowed nouns. However, as long as the words use the basic principles of derivation and the process is undertaken with respect to Arabic linguistics, they will be within the Arabic language. This analysis by El-Magrab brings out the point of the naturalization of the Arabic language which basically

[23] Seehttp://www.merriam-webster.com/dictionary/phonotactics

means altering the foreign words within the *phonotactic* barriers of the language so that they can be easily considered as a part of its grammatical systems.

3.15. Globalization

Globalization has a crucial role to play in translation in current times. Wiersema (2003) is of the opinion that, owing to the current increasing trend of globalization, one finds oneself no longer in need to desperately find the accurate translation of a term in the target language. Many English terms have been introduced into Arabic, and many Arab speakers find it more fitting to mention the global term, mostly the English term, as they think translating it into Arabic could make the target-language text lose credibility. According to Wiersema, "globalization decreases the element of foreignness in translation". For example, people speaking different languages do not need a translation to understand words like internet, facebook, email, AIDS, passport, etc.

As a global language, English has taken the lead in disseminating information particularly as regards scientific and medical terminology. Schell (cited in Cronin, 2003) describes English as a tool for global communication. Thus, English has become the global language and no other language has shown a similar degree of flexibility or appeal in terms of practicality and its widespread usage. However, until the position of English is challenged by other languages, English will continue to be the global language. Globalization has not clashed with translation; on the contrary, global English has enabled peoples of the non-English speaking world to be abreast of the latest advances in science and medical terminology. Nevertheless, translation will continue to have a major role to play worldwide irrespective of the language which assumes the global role. Cronin (2003) believes that translation has multiple cultural and social roles, and in an age of globlaization, is ever more important. He emphasises that globalization does not signal the death of the translator or translation; rather there is a renewed demand for translators and translations.

On the other hand, some researchers see that English/Arabic translation is indeed on the increase. This stemmed from the realisation that, in the transfer of knowledge, medical or technological, the language of the 'sending' countries is not that of the 'receiving' ones, and when 60% of all the world's technical documentation is produced in English only 40% of it is not (Hajjaj and Jarrah, 1998).

3.16. Standardization of Arabic Medical Terms

Arabic is a very rich language with regard to synonyms and terms but this is not always the case for medical terms which are known not to follow certain rules that would facilitate their extractions into Arabic. The problems of standardization is further complicated by the existence of several different varieties of Arabic including classical Arabic, modern standard Arabic and different dialects of colloquial Arabic.

When translating medical text, Arab translators face the problem of the non-standardisation of medical terms across the Arab world. For example, the term haemoglobin could be translated into Arabic as خضاب الدم *khudāb al-dam* or يخضور الدم *yakhdūr al-dam* or الهيموغلوبين *al-hĪmū ghlū bĪn* . As another example, vertebral column could be rendered into Arabic as العمود الفقري *al-ᶜamūd al-faqarī* or العمود الشوكي *al-camūd al-shawkī* or السياء *al-sĪyā'* or الصلب *al-salb.*

Also the lack of co-ordination between Arab countries with regard to the issue of standardization of scientific and technical terms in general and medical terms specifically (*see section 2.5.3)* widens the problem of standardization in the Arab world. Scieny (1987) explains that there are many official and unofficial agencies involved in producing Arabic scientific and medical terminology, which leads to the common problem of multiplicity of terms.

In contemporary times, the emphasis of Arabic academies which facilitate translation should be to revamp static rules so that there is more flexibility in the language of Arabic to help in better functional and practical translation.

3. 17. English-Arabic Medical Dictionaries

As translation is a path through which technology and science can pass to the world's countries that have different languages, many Arab scholars and terminologists have attempted to compile dictionaries, encyclopaedia and books to include as many words as possible alongside their meanings in Arabic. Muhammad Ibn Yūsuf al-Harawi appears to be the first Arabic scholar who composed a medical dictionary in the Arab world. In 1518 Muhammad Ibn Yūsuf Al-Harawi composed in Arabic an alphabetical medical dictionary and encyclopaedia. It covered anatomical and pathological terms and concepts, medical substances and prominent physicians, with all the entries arranged alphabetically. The National Library of Medicine in America(NLM) has one manuscript copy of this comprehensive medical dictionary (MS A 6, item 1,Savage-Smith, 2006) 6)

Dr Savage-Smith wrote a text for the NLM Website (2006) on the work of Al-Harawi:

> *"Al-Harawi wrote a lexicon titled jawāhir al-lugha (جواهر اللغة) in three chapters: the first explaining terminology for parts of the body (in alphabetical order), the second on the names of compound drugs (also in alphabetical order) and the third on the names of diseases, presented in order from head to toe according to their location. An autographed copy of jawāhir al-lugha exists in which the writer states that he completed the correction of the treatise in 1492 (London, Welcome Library for the History and Understanding of Medicine, MS Arab. 143). The bahar al- jawāhir بحر الجواهر is a very different treatise written later in 1518 (by Al-Harawi). It has no subdivisions, but rather presents all the medical terminology together in alphabetical*

order, with the explanations of the numerous anatomical, pathological and medical terms mostly in Arabic but sometimes in Persian."

In addition, NLM has two manuscript copies (MS A 16 and MS A 84) of the only known treatise by Masud ibn Mohammad al-Sijzi who worked sometime before 1334. His treatise is a relatively short introduction to the medical art, written in Arabic that focuses upon medical terminology. It consists of three sections: the first concerns medical and pharmaceutical terms and names of diseases, the second is on medicinal substances and how they might be prepared, while the third concerns compound remedies and their various types and methods of preparation.

In 1926 Muhammed Sharaf composed a medical dictionary entitled *English - Arabic Dictionary of Medicine, Biology and Allied Sciences* which is a comprehensive dictionary of the terms used in medicine, biology and all fields of science (Gibb, 1928).

In the 1960s and 1970s many English-Arabic medical dictionaries appear to have been composed. For example in 1968 Dr Yusef Hitti composed the first edition of the English-Arabic medical dictionary entitled *Hitti's Medical Dictionary*. Hitti depended on the 23rd edition (1960) and the 24th edition (1965) of *Dorland's Illustrated Medical Dictionary* and *The Faber Medical Dictionary*. He also used some English-Arabic dictionaries such as the *English-Arabic Dictionary of Medicine, Biology and Allied Sciences* by Muhammed Sharaf, Cairo (1926), the *French-Arabic Dictionary of Agricultural Terms* by Mustafa Al- Shihabi, Cairo (1943) and the *Zoology Dictionary* by Amin Fahid Malwaf. The fourth edition of *Hitti's Medical Dictionary* (published in Beirut in 1982) incorporated anatomical plates in colour and an English-Arabic glossary of the designated terms. In 1970 A M Owhida composed an English-Arabic medical dictionary entitled *The New Medical - Pharmaceutical Dictionary* which contained terms that are used in pharmacy, together with illustrations. In 1978 Milad Gh. Bishay composed *Bishay's New Illustrated Medical Dictionary in English-*

Arabic. It is a comprehensive dictionary of terms used in all branches of medicine and allied sciences, including medicine, physics and chemistry, dentistry, pharmacy, nursing, zoology and botany with illustrations and tables.

In an attempt to standardize medical terms in the Arab world, the Arab Medical Union took the initiative to recommend the compilation of an English-Arabic unified medical dictionary. As a result of this initiative, in 1966, a specialized Committee of Arab Experts was set up with Dr M. Khayat as the rapporteur to verify and enrich the first edition which was originally compiled in 1973 in Baghdad. The second edition was published in 1977 in Cairo and the third edition, which was published in 1983, was an English-French-Arabic dictionary.

In the late 1980s Dr Al-Khayat, as Deputy Regional Director/EMRO, prepared a fourth edition to cover the widest possible range of medical terminology to be made available for users. He led a selected committee/panel of experts from almost all the Arab countries: Dr J. Anouti (Lebanon), Dr A. Benchekroun (Morocco), Dr S. Chibane (Algeria), Dr A. El-Bedri (Iraq), Dr M. Jalili (Iraq), Dr. E. Jeddi (Tunisia), Dr M. H. Al-Khayat (Syria), Dr A. H. Lotfi (Egypt), Dr M. Mahasseni (Syria), Dr H. Sabah (Syria) and Dr M. A. Soliman (Egypt). Hard work was undertaken over many years to produce the final material for the fourth edition[24].

The committee made use of feedback, comments and information received from a large number of experts and professionals from all over the Arab world. Special attention was paid to the medical terms approved by the Arab Academies in Cairo and Damascus. The committee also made sure that the Arabic terms were selected carefully in accordance with a very strict, clear, simplified and user-friendly methodology. (Al-Jalabi, 1984).

The main contributors to the *Unified Medical Dictionary* were:

- The Council of Arab Ministries of Health
- The World Health Organization (WHO)

[24] See www.applications.emro.who.int/dsaf/dsa563.pdf

- The Arab Medical Union
- The Arabic League, Educational, Cultural and Scientific Organization (ALESCO)[25]

In 1996 a computerized version of UMD was produced and in 2000 a computerized version and a hard copy version was produced. Since 2006 the online *English-Arabic Unified Medical Dictionary* (UMD) has been available on the internet on the WHO website[26].

Although much effort was undertaken by Arab scholars in the compilation of this dictionary, it has been very difficult to update it continuously and to keep up with the enormous rapid developments in science and technology in general, and in the medical area specifically, which are usually presented in English.

In the 1980s and 1990s some efforts were made by some Arabic scholars and terminologists who had an interest in, or worked in, medical fields. Among these was Bin Murad Ibrahim from Tunisia, a member of the Arabic Academy. In 1985 Bin Murad composed a volume on medical terminology entitled *al-mustalah al-ᶜjamī fī kutub al-tibb wa al-saydala al-ᶜarabiyya* (Foreign terms in Arabic medicine and pharmacy books). In 1983 K Al- Shihabi composed an English-Arabic medical dictionary. In 1999, Hagi, who works for EMRO, compiled *the Academia Medical Dictionary English-French-Arabic*. This dictionary was introduced by Dr M. Al-khayat. In the 2000s some other English-Arabic medical dictionaries have been composed such as *Marashi's Grand Medical Dictionary* by M. O. Marashi, 2003, and an *Atlas Explanatory Dictionary of Medicine* by R. Bakhait, 2007.

In the late 20th and 21st century, as a result of rapid developments in computer technology, many electronic and online Arabic medical dictionaries and CAT tools were produced. One of them is *the Electronic Saudi Terminology Data Bank* البنك الألي السعودي للمصطلحات *al-bank*

[25] See www.emro.who.int/UMD/AboutUMDCD.HTM
[26] See www.emro.who.int/UMD

*al-ālī al-su^{c}ūdī lil mus*t*ala*h*āt*. It is a German, French, English and Arabic updated dictionary that was produced by King Abdul-aziz City for Science and Technology مدينة الملك عبدالعزيز للعلوم و التقنية madīaz^{c}-abd al^{c} malik-nat alīul^{c} z lilūaqniyya in 1983. It includes t-m wa al scientific and technical terms with their translations from German, French and English into /Arabic[27].

There are also some monolingual medical dictionaries which can be useful in understanding the meaning of medical terms in English. The most popular of these dictionaries are *Stedman's Medical Dictionary*, *Webster's Medical Dictionary*, *Dorland's Illustrated Medical Dictionary* and *Mosby's Medical Dictionary.*

3. 18. Conclusion

In summary, it can be said that the Arab world has seen a lot of changes throughout the years, particularly in terms of culture, which is being significantly altered, and in the increase in the usage and implementation of newer technologies in all aspects of life including communication technologies followed by the adoption of newer technical terminologies. This also throws light on the spread t of the English language globally, making it a worldwide language. Keeping this in mind, it is critical to analyse the practice of translating to and from the English language, in the parameters of globalization. Through the adoption of newer terminologies in the Arabic language, it can be seen that, on several occasions, the newly coined word is a combination of English and Arabic words. Although these are easily used within the language, it is also seen that, at times, they are not capable of completely covering the technological and scientific ideas of the English context.

From the aforementioned discussion, it is obvious that the problem of medical translation from English into Arabic is due to the way medical terms are understood and represented.

[27] See http://www.phys4arab.net/vb/showthread.php?t=16277

Word derivations, creation and reasoning are often done in another language, not Arabic. Arabic also uses these methods in producing new medical terms. This is how medical terminology works in the context of Arabic translation. Arab translators use different methods in their translation of medical terms which are translation, transliteration, literal translation and arabization. Also, it can be said that, through strategies such as the addition of information, the deletion of information and structural adjustment, the problems of equivalence can be better eased or solved in the context in which these occur.

Furthermore, as science and technology develop, new English words which are used to express new concepts, techniques and inventions come into existence. This would necessitate the existence of new Arabic equivalent terms as well. The job of Arab terminologists and linguists is to coin an Arabic equivalent for each new medical term and to update English-Arabic medical dictionaries to include as many medical terms as possible because such dictionaries are the main resource for the Arabic translator of medical text. And the Arabic translator of medical text should have a knowledge of both languages SL and TL beside his knowledge of the medical field. Despite the efforts that have been made by Arab scholars in regard to terminological inconsistency, neologism, polysemy, and non-equivalence in medical terminology, these problems still exist and many medical dictionaries need to be updated. Also, more efforts need to be made by Arab terminologists and scholars to help in updating MT and CAT tools to include more Arabic medical terms.

Chapter Four: Methods

Chapter Four: Methods

4.1 Introduction

This chapter presents a full description of the study methodology. It highlights the methods and procedures used to collect the amount and type of data deemed necessary to conduct a reliable study. It explains how the data were chosen and defines the sources of data, the districts covered in this study and the criteria according to which these choices have been made. This chapter also shows the techniques employed in the data collection and those used in the administration of the study test (questionnaire). Furthermore, this chapter identifies the population and sample of the study and provides the significant details about the study respondents. It also includes the pilot study and its results. In conclusion the criteria and methods used for the data analysis are explicitly stated**.**

4.2 Research Design

Research design links the collected data to the hypotheses and the questions of the study. Yin (1984:27) believes that "*a research design is the logic that links the data to be collected (and the conclusions to be drawn) to the initial questions of a study*".

This study adopted a qualitative-quantitative approach entailing a descriptive and evaluative analysis. In the empirical section of the study, the researcher applied Kussmaul (1995)'s idea of translation quality assessment which involves description of errors , finding the reasons for the errors and lastly helping to find solutions to correct the errors. A questionnaire (test) was conducted to come up with representative results

4.2.1 Districts and Respondents

As this study is concerned with the translation of medical terms into Arabic for the purpose of finding out the problems of translating English medical terms into Arabic, postgraduate students in Tripoli Academy and Benghazi Academy in Libya (the only higher education institutions in Libya which have an Arabic translation programme) and different UK universities, as listed below in 4.2.2, are targeted. Also, Arabic translators working at UK hospitals, clinics, health centres and GPs are included to provide a sample.

4.2.2 Population and Samples of the Study

The present study is based on two samples:

Sample one included male and female research postgraduate students who were doctoral students in Arabic translation studies or related fields at different universities in the U.K. and Libya. The researcher obtained fifty-four responses from seventy questionnaires were originally distributed. They were from nine students from Durham University, eleven students from Salford University , four students from Liverpool John Moores University, five students from Exeter University, four students from Manchester University, four students from Leeds University, eight students from Tripoli Academy in Libya and nine students from Benghazi Academy in Libya. The involvement of the students was purposeful as they were all Arabic native speakers and highly educated in English which means that they can speak Arabic and English. So, they would provide a good sample as to how they would tackle the challenge of the problems of translating medical terms from English into Arabic. Their translations and answers were helpful for the researcher in her current study.

Sample two included twelve Arabic translators working in different hospitals, clinics, GPs and health centres across the UK. The researcher managed to get twelve responses from fifteen sites found on the web for Arabic community interpreters in the UK. The sample is

representative in that it included four responding translators who have less than five years' experience of working in the medical field and eight who have five years or more of experience of working in the medical field (based on their answers on the questions at the beginning of the questionnaire). According to British Standard 2006[28], for the translator to be a professional experienced translator he/she has to have been working as a translator for at least five years. No responding translators were trained to work in the medical field when they started their job as medical translators. This means that the subjects in sample two may work in the medical field without training.

The aim of the questionnaire was to induce the participants to act on his/her own to tackle the translation problems of medical terms and to check if the participants benefited from the dictionaries and/or computer-aided translation tools that they could consult in their translation of the items. Also, it aimed to find out what kind of strategies the samples employed in the translation of medical terms into Arabic.

4.2.3 The Sources of Data Collection

The questionnaire was used to investigate different medical terms identified by the researcher. A term means a word or a group of words designating something, especially in a particular field, as atom in physics, quietism in theology, adze in carpentry, or district leader in political terminology[29]. The medical terms used in this research contain single word, compounds or abbreviations. All terms used are related to medicine and chosen from different medical materials consisting of:

- 35 medical reports translated into Arabic by official translators in Tripoli, Libya. These reports were collected by the researcher and were kindly donated by patients and their parents with their consents to be used as sources of data collections in this study.

[28] Seehttp://qualitystandard.bs.en-15038.com/
[29] http://www.defintions.net/defintion/term

- the World Health Organization (WHO) reports 2007 and 2008 (and their Arabic translations). These reports were available with their Arabic translations at the time of the study and were accessible to the researcher.
- 13 medical leaflets and flyers produced and translated into Arabic by the National Health Service (NHS) in England. The 13 leaflets were collected by the researcher from different hospitals, health centres, clinics and GPs in Manchester.

The materials used were easily accessible to the researcher and were produced and translated by official bodies: the NHS in England, the WHO, and a recognized official translation office in Tripoli, Libya (Al-maqarīf Translation Office, Tripoli). To ensure the high quality and accuracy of the Arabic translations for the chosen medical terms, they were double-checked by the researcher using English-Arabic medical dictionaries, namely the *Unified Medical Dictionary* (printed and online copies) adopted by the WHO and *Hitti's Medical Dictionary*. These dictionaries are commonly used in Arab countries. Romani (n.d. 95) argues that *UMD* and *Hitti's* are standard dictionaries that are widely used in Arab countries .Monolingual medical dictionaries including *Mosby's Medical Dictionary*, *Nursing and Allied Health Dictionary*, *Stedman's Medical Dictionary* and *Webster's Medical Dictionary* were also used to find out the meaning of some medical terms which cannot be found in English-Arabic medical dictionaries. The dictionaries mentioned are commonly used and are available and accessible in the main libraries in Libya, Egypt, Tunisia and the U.K. Additionally, some major medical sites were consulted such as the NHS websites[30] and the WHO websites.[31]

The medical terms were chosen in such a way as to represent all types of medical terms, excluding pharmacy-related terms (as most pharmacy terms are formulas, trade names and drug names, most of which cannot be translated into Arabic). These terms include the names

[30] www.nhscareers.nhs., www.nhs.uk/condions , and www.rbht.nhs.uk
[31] www.emro.who.int , www.cdc.gov www.uihealtcare.com

of diseases, conditions, parts of the body, medical equipment, viruses and tests, all of which are analyzed in this study. In section 4.2.4.1 there is more discussion on the way in which these medical terms were chosen.

To test the validity of the broad hypothesis of the study, namely that translating medical terms into Arabic is most likely to prove a serious translation challenge to untrained Arabic translators a pilot study test and a questionnaire were drawn up and administered. These two instruments included representative medical terms , taken from the above mentioned materials.

4.2.4 Data Collection

Furthermore, to make this research valid and reliable, the study was carried out by means of a questionnaire that was designed to obtain the data necessary for the purpose of analysis. For the questionnaire to be effective and before it was given out, a pilot test was administered to help structure the main instrument (the questionnaire) for the data collection of the study and to find out how serious the difficulties are in the translation of medical terms into Arabic.

4.2.4.1 The Questionnaire

To obtain a reliable representative corpus of data, a well designed questionnaire was created for this study. After conducting a pilot study, a stage in which the questionnaire was updated, revised and finalized, a five-page questionnaire was developed. The purpose of the questionnaire was to measure the students' ability to translate medical terms and to evaluate the challenge to professional translators when translating medical terms and the effect of their experience on their translations.

was the main instrument of this study. Before it was produced in its final form, a number of fundamental stages were undertaken. Firstly, all sentences and phrases that contained medical terms were collected and listed from the reports and other materials listed in Section 6.2 above. Pharmacy-related terms were excluded, as most of the latter are formulas and trade

names and have no equivalents in Arabic. This produced a list of 321 sentences and phrases. The selected sentences and phrases contained 369 medical terms. The second stage involved sorting through the chosen sentences and phrases to avoid repetition and take out the sentences that had been used in the pilot questionnaire. As a result, the 321 examples were screened again and reduced to 285 sentences and phrases. Finally, three additional considerations were taken into account: first, the extreme importance of keeping the test to a sensible length so that the participants could have a chance to translate all the items; secondly, the importance of giving the participants enough time to complete the items and thus avoid putting them under time pressure which could negatively affect their translation process; thirdly, the results of the pilot study were taken into consideration.

Keeping these factors in mind, the 285 sentences were listed in alphabetical order. To be randomly chosen by the researcher, the sentences were grouped alphabetically according to the first letters of the first word in each sentence. For example, sentences and phrases where the first word began with 'A' were collected in one group, called group A. and sentences and phrases that started with a word beginning with 'B' called group B, etc. After that, the first three sentences from each group were chosen, totalling 52 sentences and phrases containing 63 medical terms. Finally, 37 sentences and phrases containing 45 items, out of 52 sentences, were chosen randomly by the researcher to simulate the effects of receiving a new translation commission by a client on a topic which the translator does not know in advance. The 45 terms were to be the final representative examples and suitable in length. The context of each term within the sentence helped the respondents to determine the meaning of the medical terms. It should be borne in mind that some sentences contained more than one medical term but only one medical term needed to be translated each time, so some sentences appeared in the questionnaire more than once according to the number of medical terms that they contained (only one medical term is highlighted in each repeated sentence). For example, the

following sentence was repeated four times in the questionnaire as it contains four medical terms that were chosen to go in the questionnaire (see Appendix 2):

*10. Drug resistance is also evident in diarrhoeal diseases, **hospital-acquired infections**, malaria, meningitis, respiratory tract infections, and sexually transmitted infections, and is emerging in HIV.*

*11. Drug resistance is also evident in diarrhoeal diseases, hospital-acquired infections, **malaria**, meningitis, respiratory tract infections, and sexually transmitted infections, and is emerging in HIV.*

*12. Drug resistance is also evident in diarrhoeal diseases, hospital-acquired infections, malaria, **meningitis**, respiratory tract infections, and sexually transmitted infections, and is emerging in HIV.*

*13. Drug resistance is also evident in diarrhoeal diseases, hospital-acquired infections, malaria, meningitis, respiratory tract infections, and sexually transmitted infections, and is emerging in **HIV**.*

The main study instrument included one test to obtain the data required for the study and two open questions at the end. The test consisted of forty-five medical terms. Each sentence and phrase in the questionnaire contained one or more medical terms. Only one medical term was to be translated into Arabic in each sentence. The intended terms to be translated were highlighted to draw the respondents' attention to the main task they were requested to do and to focus on translating the chosen term. The context would help the respondents to figure out the exact meaning of the item and provide the most appropriate translation that they could. The informants were allowed to use dictionaries and to consult websites.

Based on the results of the pilot (which was also a questionnaire), some open questions needed to be added in the main questionnaire. At the end of the questionnaire two open questions were given to the participants. The purpose of the first question was to find out how helpful the medical dictionaries were in translating the medical terms. The second question was about the strategies that were used by the subjects to tackle the difficulties of translating the items used in the test. Unfortunately, only nine students out of 54 answered the second question and three of the answers were not clear, so the researcher herself tried to find out the strategies that the students had employed in their translation of the medical terms in the discussion of the data analysis.

It should be mentioned here that the researcher knows that there were some weakness in the structures and format of the main questionnaire that was given to the postgraduate students. But the researcher found it useful to use the same questionnaire to be given to professional translators who work in the medical field for two reasons: firstly, to compare the ability of the students and professional translators in translating medical terms. Secondly, to see how the experienced translators deal with and translate medical terms compared to the inexperienced translators. At the same time, some adjustments used to the main questionnaire to be more effective. These adjustments included:

Two questions were added to the beginning of the main questionnaire that was given to the professional translators to obtain more information about their years of experience in working in the medical field and if they had been trained to work in the medical field. These two questions helped the researcher to find out the influence of experience and training on the quality of translation.

The researcher found it useful to ask the professional translators about the strategies that they employed in their translation of the medical terms, after each term, as they might use different strategies depending on the type of the term.

At the end of the questionnaire, the researcher considered asking the translators if they also consulted computer-aided translation tools as well as English-Arabic medical dictionaries. (The adjusted questionnaire was titled Questionnaire A, see appendix 3)

4.2.4.2 Validity and Reliability of the Test

Validity and reliability were ensured through two means. The first was that all the examples (i.e. the medical terms) of the study were taken from officially valid and reliable sources that were readily available and accessible to the researcher. Some were taken from the officially produced material of the WHO and the NHS. The World Health Organization (WHO) in Geneva and the National Health Service (NHS) in the United Kingdom represent reliable and major bodies and are sources of information on medical issues in many different languages including Arabic and English. Other examples were taken from private medical reports produced by specialists and translated into Arabic by official Arabic translators in Tripoli, Libya. These reports (the original and their Arabic translation) were obtained from patients and the parents of patients with their consent. The original and the translation of the reports were also regarded as a reliable source. The second means of ensuring validity and reliability was by carrying out a pilot study before the administration of the main study. The results gave the researcher a lot of insight into the study of medical terms and reinforced the impression that this phenomenon merits studying as a problematic translation area.

4.3. The Pilot Study

The pilot study is usually carried out in preparation for the major study. However, a pilot study can also be the pre-testing or 'trying out' of a particular research instrument (Baker 1994). The questionnaire was the main study in this research, so conducting a pilot which was also a questionnaire test, enabled the researcher to adjust the main test slightly. Polit et al

(2001: 467) say that a pilot test is *"a small scale version[s], or trial run[s], done in preparation for the major study"*. So, before producing the main instrument of the study (the questionnaire), the researcher formed and conducted a pilot study test which was a questionnaire, containing ten medical terms to be translated into Arabic (see Appendix 1), in order to ensure that the phenomenon of medical terms was worthwhile studying as a problematic translation area and to ensure that the main questionnaire was a reliable and valid instrument. Another reason for performing the pilot test was to help the researcher to calibrate and select the items that should go into the main instrument (the main questionnaire) in a more representative way.

4.3.1 Sample and Data Collection

The sample for the pilot study consisted of eight Arabic M.A. translation postgraduate students from Tripoli Academy and Benghazi Academy in Libya. Ten sentences which contained medical terms were randomly selected by the researcher from the list containing 321 (see 4.2.4.1) that were taken from some medical reports, World Health Organization reports (2007 and 2008) and from different leaflets, flyers, forms, and advertisements published by the NHS (England), all of them having Arabic translations. Thus, the test consisted of ten sentences. Each sentence had one medical term that required translating. None of these terms was re-employed in the main questionnaire. The test was limited in length. The respondents managed to complete the test in 30 minutes as planned and they were allowed to use dictionaries.

4.3.2 Data Analysis

The responses by the subjects of the pilot study were analyzed. Their translations were rated and classified according to three measures:

Acceptable translations

The following were counted as acceptable translations:

- An existing Arabic equivalent or meaning for the English term which appears in the Arabic translation of the materials used. These translations were double-checked via English-Arabic medical dictionaries and via English-English medical dictionaries.
- A correct explanation for terms that cannot be found in dictionaries or do not have an Arabic equivalent. The explanations were checked in the English-English medical dictionaries and major medical websites (see Section 4.2.3).
- The use of an accepted transliteration or arabization of the term was considered as a correct translation. Examples included:

  Cholera الكوليرا al-kūlīrā

  AIDS الايدز al-aydz

  Malaria الملاريا al-malāriyā

Table 2 below contains what are considered as correct and acceptable translations of the chosen items. The second column contains the official translations of the terms (such as the Arabic translation of the WHO reports). The third column contains some possible translations taken from medical dictionaries such as:

Online Unified English-Arabic Dictionary

Hitti's English-Arabic Medical Dictionary

Stedman's Medical Dictionary

Webster's Medical Dictionary

Mosby's Medical, Nursing and Allied Health Dictionary

The above dictionaries are popular and can be found in main libraries in Libya and England.

The fourth column includes some further correct suggestions made by the researcher, such as definitions and explanations. These explanations were checked carefully by the researcher in the above English-English dictionaries and on reliable medical websites.

Table 2: The Acceptable Translation of Medical Terms

Medical terms	Official translations	Possible translations (taken from the above medical dictionaries)	Other acceptable suggestions
HPV vaccine	لقاح الورم الحليمي	لقاح الورم الحليمي	لقاح ضد الاصابة بالاورام الحليمية
Yellow fever	الحمى الصفراء	الحمى الصفراء	
Diarrhoeal diseases	امراض الاسهال	امراض الاسهال	امراض يصاحبها اسهال
Marburg haemorrhagic fever	حمى ماربورغ النزفية	حمى ماربورغ	
Speech therapy	معالجة النطق	علاج النطق	علاج المشاكل المتعلقة بالكلام و البلع
Severe oesophageal reflux	ارتداد ارتجاعي مزمن		ارتداد مريئي حاد
Emphysema	انتفاخ الرئة	النفاخ	تضخم الرئة
Creutzfeldt Jakob disease	امراض جاكوب		
Nystagmatism	تذبذب مقلة العين	رأراة العين	الحركة اللارادية للعين
Dengue	حمى الضنك	حمى الضنك_ ابو الركب	

Unacceptable translations

The following were counted as unacceptable translations (according to the official translations, medical dictionaries and websites mentioned in section 4.2.3):

- Where the respondents had failed to grasp the idea behind the item.
- Using uncommon transliterations or arabizations that do not exist in Arabic for the terms which already have Arabic equivalents, for example:

  Nystagmatism نستيقماتيزم nistīqmātīzim

  Speech therapy سبيتش ثيربي sbītsh thīrabi
- Incorrect explanation of the term.
- Incomplete translation.

Blank option

This means that the respondents provided no translation.

4.3.3 Results of the Pilot Study

The results of the pilot study can be seen below in Table 3. The researcher computed the scores of the acceptable, uncorrectable and blank cases for each of the ten terms and converted the scores into percentages. Then, the total mean percentage of each of the three criteria was calculated.

Table 3: **The Results of the Pilot Study: The Distribution of the Sample's Responses**

No	Medical terms	Acceptable translation %	Unacceptable translations %	Blank %
1	HPV vaccine	37.5	62.5	-
2	Yellow fever	100	-	-
3	Diarrhoeal diseases	37.5	62.5	-

4	Marburg haemorrhagic fever	50	50	-
5	Speech therapy	50	25	25
6	Sever oesophageal reflux	25	37.5	37.5
7	Emphysema	62.5	25	12.5
8	Creutzfeldt-Jakob disease	37.5	12.5	50
9	Nystagmatism	-	87.5	12.5
10	Dengue	75	12.5	12.5
Total		474	375	150
Total Mean %		47	38	15

From the above Table, the results can be interpreted as follows:

- acceptable translations constituted 47% of the total responses.
- unacceptable translations constituted 38% of the total responses.
- No translation constituted 15% of the total responses.

The total mean percentage of the unacceptable measures accounted for 38%. This is a significant figure in a sensitive field of translation such as medical translation. The unacceptable measures were taken as serious and important indicators as they reflect the difficulties involved in translating medical terms into Arabic. The figure strongly supports the hypotheses mentioned earlier and encouraged the researcher to investigate the difficulties and problems associated with the translation of medical terms and to modify the main questionnaire on the basis of the pilot study results.

4.4. Analysis of the Main Data

The collected data (i.e. the translations of the forty-five medical terms that the students and official translators were requested to make) were analyzed separately in two tables according to various criteria. Chapter five presents these analysis in two ways. Firstly, all the terms were analyzed in light of two criteria: the first one was that the translators should be able to provide the correct Arabic equivalent for the English term, the second criterion was that the terms were analyzed in terms of the errors and difficulties associated with their translation on the part of the subjects in the study. The second way exposes the type of strategies the subjects used in their attempts to translate the items involved. According to the postgraduate students' results, the first part of the analysis forms the basis upon which these translation strategies were identified. For the professional translators, the analysis of the strategies included their answers about the strategies they have employed in their translations for each term.

The subjects were told that the results of the questionnaire test would be used as a part of Durham University PhD research. They were not asked to write their names on the questionnaire. The next chapter (six) deals with the quantitative and qualitative data analysis and a discussion of the questionnaire results, followed by a conclusion, remedial solutions, suggestions and recommendations.

Chapter Five: Data Analysis and Discussion

Chapter Five: Data Analysis and Discussion

5.1 Introduction

In the previous chapters, particularly in chapters two and three, the researcher has shed light on the translation of technical terms into Arabic in general, and on medical terminology with a specific focus on the problems of translating medical terms into Arabic. The approaches and arguments used in the previous theoretical parts will be further elaborated and explained in this practical part. A questionnaire was carried out as the main study test to examine the difficulties and problems involved in translating medical terms from English into Arabic and to find out the strategies that have been employed by translators in translating such medical terms. In this chapter, the responses of the participants of both samples in the main study test are analysed and will form the basis on which the conclusions of this study will be based.

Each of the forty-five items were analysed and discussed separately according to their own statistical results and these will be presented in the form of Table 4 (answers of Sample One) and Table 5 (answers of Sample Two). These statistics were calculated from the responses delivered by all the subjects. To avoid repetitiveness in the presentation of the results, the researcher believed that it would be more expedient to select some acceptable and unacceptable answers to be included in the discussion as examples. The researcher believes that the selected answers are the most adequately representative and illustrative suggestions that reflect the real nature of the problem of translating each term. The presentation of the results and the discussion of the results will focus on the exposure and identification of the real nature of the problems faced in the translation of each type of term. The researcher will attempt to find out the main causes of these problems and errors and how they affect the job of translation in the medical field.

From the answers of Sample One and Sample Two to the open question at the end of the questionnaire, the researcher found that most of the subjects used medical dictionaries and few consulted CAT tools to check the translation of the medical terms and most of them believed that medical dictionaries and CAT tools were not helpful in finding out the meaning of some medical terms.

For a broader view of the degree of difficulty involved in translating medical terms and in order to obtain more accurate statistics, the researcher chose to involve in the statistics the cases of the medical terms that were left un-translated. This category is labeled as "Blank" in Table 4 and table 5. Hence, Table 4 and table 5 include three main columns with the headings listed below. The total of these columns makes the 100% that stands for and represents the total number of the subjects. The three main columns refer to:

- The percentage of acceptable translations.
- The percentage of unacceptable translations.
- The percentage of blank cases.

The official Arabic translations provided by the WHO and the NHS and the official translators in Tripoli, Libya, are referred to in the discussions for each term in order to compare and contrast them. Other acceptable translations given by the subjects will be highlighted as well. Finally, wherever it was felt that any of the official Arabic translations were unacceptable (according to the medical dictionaries, CAT tools and the major and reliable websites that were consulted) this will be indicated. The answers of the participants will be separately presented in two tables: the answers of Sample One will be presented in Table 4 and the answers of Sample Two will be presented in Table 5, so the researcher will be able to compare the answers and to see how professional translators deal with translating medical terms. Table 6 will include the strategies used by sample 2.

5.2 Part One: Translating Medical Terms

5.2.1 Analysis of Errors and Difficulties

5.2.1.1 Analysis of Postgraduate Students' Answers (Sample One)

The Table below shows the results from the student translators' responses. It shows that 58% of the subjects' suggestions were acceptable translations. Unacceptable translations constituted 23%, and 20% were blank, which means that the participants did not give any response. Unacceptable translations reflecting the difficulties encountered in these translations accounted for a percentage of 23%, which is a significant number in a sensitive field like the medical field. This percentage indicates the difficulties in translating medical terms which are one of the hypotheses of the study.

The medical terms are listed in alphabetical order according to the sentence from which they were originally taken. (See appendix 2 for the alphabetical order of the sentences that contain the medical terms to be translated by the participants.)

Table 4: Percentage Results of the Translations of Medical Terms (given by postgraduate students)

N	Medical Terms	acceptable %	Unacceptable%	Blank
1	Orthotic appointment	19	54	28
2	Outpatient appointment	61	33	6
3	Phlebotomy	22	44	31
4	Cholera	96	-	4
5	Meningococcal diseases	65	13	22
6	Tetraplegia	72	9	19
7	Hypermetropia	52	28	20

8	Astigmatism	43	37	20
9	Cystoplegia	39	19	43
10	Hospital-acquired infections	83	11	6
11	Malaria	91	6	4
12	HIV	69	24	7
13	Meningitis	85	6	9
14	Ebola	30	50	20
15	Nipah virus	65	7	28
16	Pediatric hematology department	63	17	20
17	Neurologists	20	67	13
18	Physiotherapy	85	7	7
19	Occupational therapy	57	30	13
20	Immunisation	63	31	6
21	Plague	94	-	6
22	AIDS	94	-	6
23	MRI	74	17	9
24	Thalassaemia	50	15	35
25	Aspiration	13	67	20
26	Demyelinating neuropathy	7	69	24
27	Retinopathy	61	20	19
28	SARS	31	43	26

29	Smallpox	94	2	4
30	Anthrax	81	17	2
31	Catheter	78	2	20
32	Orthoptic Clinic	59	28	13
33	Paediatrician	83	13	4
34	Tuberculosis	78	-	22
35	Bovine spongiform encephalopathy	57	15	28
36	Flu jab	37	39	24
37	Neuropathy	76	4	20
38	Videofluoroscopy	2	63	35
39	Fundoplication	13	39	48
40	Gastrostomy	30	44	26
41	Haemophilia B	44	22	33
42	Immunology assessment	81	2	17
43	Ophthalmologist	72	-	28
44	African trypanosomiasis	41	6	54
45	Haemoglobinopathies	74	7	19
	Total	2608	1024	900
	Total mean %	58	23	20

To explain what has been shown above, the 45 examples will be discussed in turn illustrating the different kinds of problems linked to the translation of each one of them. Examples are

given of acceptable and unacceptable translations, but these are not complete; only the most common have been listed.

Term 1 Orthotic appointment

The term was correctly rendered by 19% of the respondents. Along with the translation taken from the official translation, موعد في عيادة تقويم العظام , the following translations given by the participants were considered as acceptable translations :

(1 a) موعد لتقويم العظام

(1 b) موعد في عيادة دعامة العظام

This term is a compound as it contains more than one element, *orthotic and appointment*. It was a problematic term as 28% of the responses were blank and 54% of the subjects had translated the term wrongly producing translations such as:

(1 c) تقويم العظام

(1 d) موعد تقويمي

(1 e) موعد في عيادة عظام

(1 f) موعد مع طبيب العظام

The majority of the subjects failed to get the right meaning of the term in Arabic. Apparently, the first element of the term *orthotic* is responsible for the confusion. As a result of the confusion, the term was interpreted as موعد في عيادة عظام and تقويم عظام, and موعد مع طبيب عظام . As is shown in 1c, e, and f the subjects dealt with *orthotic* as a synonym for *bone.* The reason behind this confusion could be that *orthotic* is related to the making and fitting of orthopaedic appliances, or to adjusting the position of the body which normally controlled by the bones (see *Stedman's Medical Dictionary*, 2006:1384). 1d shows that some subjects failed to specify the kind of adjustment for the target readers by giving the translation موعد تقويمي . It is very clear that the subjects, in this case, managed to grasp the meaning of the element *orthotic* in Arabic, but they failed to give the correct meaning of *orthotic appointment* as a

compound in Arabic. This compound cannot be found in *Hitti's Medical Dictionary* nor in the *Unified Medical Dictionary*. The subject could, however, consult a related reliable website[32] for more understanding of the meanings of the term.

Depending on bilingual dictionaries and computer-assisted translation (CAT) tools may not be helpful when looking for a translation of a term that is a compound into Arabic.

Term 2 An outpatient appointment

This resembles term 1 in that it consists of two elements, the second being *appointment*, which is a common word and it was easy for most participants to grasp the correct meaning of the term. The following are some examples of correct translations which totaled 61%.

(2 a) موعد في عيادة خارجية

(2 b) موعد لمراجعة المريض في عيادة خارجية

The first translation was also given in the official translated version.

The problem is the element *outpatient* which was rendered literally as:

مريض خارجي , مريض خارج المستشفى, مريض غير نزيل بالمستشفى in many unacceptable responses.

The results show that 33% of the participants' translations were generally unacceptable as in:

(2 a) موعد بعيادة خاصة

(2 b) موعد المريض الخارجي

(2 c) موعد مريض خارجي

(2 d) موعد خارجي

(2 e) توجيه المريض عند خروجه من المستشفى

(2 f) استكمال العلاج خارجيا

As mentioned above, the term *outpatient* was sometimes literally translated as خارجي and *patient* as مريض , so the subjects produced incorrect meanings as in 2b and c. The subjects

[32] http://www.manchesterorthotics.coi.uk/what-is-an-orthotic.html

have recognized that *outpatient* is something outside the hospital, but they could not manage to give the correct equivalent in Arabic. It could be noticed that some of the subjects may have consulted the online *UMD* for the meaning of outpatient which gives ' مريض خارجي' as an equivalent for the term, but the subjects should use their own knowledge in translating compounds as such compounds cannot usually be found in dictionaries. Also, CAT tools may not give the exact meaning of the compounds.

About 6% of the returns were blank.

Term 3 Phlebotomy

The term is a Greek word which consists of two parts: the root *phleb* meaning vein and the suffix *tomy* meaning incision. The meaning of the term, according to *Stedman's Medical Dictionary* (2006: 1481) and *Mosby's Medical, Nursing and Allied Health Dictionary* (1998: 1677), is an incision into a vein for the purpose of drawing blood. 22% of the participants managed to rely on the context and rendered the term correctly by giving two correct translations which were close to the translation given in the official version. Their translations were:

(3 a) سحب دم عن طريق الوريد

(3 b) اخذ عينة دم من الوريد

The translation of the term in the official version is سحب عينة دم من الوريد

Some subjects (33%) tried to depend only on the meaning of the term without resorting to the context of the term within the sentence. The following is the sentence where the term appeared:

*Children requiring **phlebotomy** need to have an appointment booked for blood tests*.

thus they provided wrong translations such as:

(3 c) فصد الوريد

(3 d) عملية فتح في الوريد

(3 e) استئصاال الوريد

(3 f) الوريد

(3 g) تحليل دم

3c is the same translation that is given in the *Unified Medical Dictionary* and considered as unacceptable, and 3d show that the subjects used literal translation to resolve the problem of translating the term. 3e is a surprise mistake which means take out the vein from the body. In 3f the subjects rendered the first part of the term *phleb* "vein"وريد and ignored the second part *tomy*. 3g could be back-translated as a blood test. 31% of the responses were blank. Even understanding the meaning of affixes may not be helpful in some terms, as seen in the translation of the above term. The translator needs to rely on the context in such situations.

Term 4 Cholera

This term scored the highest percentage of acceptable translations (96%) with no unacceptable translations. Only 2 participants (4%) did not give any answer. There are two reasons which could be behind this: the first is the subjects' familiarity with the disease as it is a common disease around the world. The second reason is the use globally of the term *cholera* as it is transliterated into Arabic as كوليرا . Although there is an Arabic equivalent for the term which is هيضة , the transliteration of the term is still used and known by Arabs and can be found in most English-Arabic medical dictionaries (see online *Unified Medical Dictionary* and *Hitti's Medical Dictionary*). So, both translations كوليرا and هيضة were regarded as acceptable translations. Even in the official translation the equivalent كوليرا was adopted.

Term 5 Meningococcal diseases

This seems an easy term as 65% of the participants delivered acceptable translations. Meningococcal is an adjective that describes the diseases, so the acceptable translation could be الامراض السحائيةas it appears in the official translatied version. Also, the following

translations would be regarded as acceptable translations (according to *Unified Medical Dictionary* and *Hitti's Medical Dictionary)* :

(5 a) امراض المكورات السحائية

(5 b) الاوبئة السحائية

(5 c) امراض بكتريا السحايا

22% of the participants did not provide any translations, and 13% of the participants experienced difficulties in capturing the exact meaning of the concept. They gave unacceptable translations such as:

(5 d) التهاب السحايا

(5 e) السحايا

(5 f) البكترياء السحائية

Obviously, these translations failed to convey the correct idea of the SL original message. For instance, 5d التهاب السحايا , which was given by most participants that gave an unacceptable translation of the term (most of the 13%), could be back-translated as "meningitis" (see Term 13); 5e السحايا is an equivalent for meningo and 5f البكتريا السحائية means meningococcus.

Although the participants who gave the unacceptable translations understand the meaning of the prefix meningo which is related to السحايا, they have failed to pick up the right semantic relationship that links the two elements of the term, which are *meningococcal* and *diseases*.

Term 6 Tetraplegia

This is a synonym of quadriplegia (*Stedman's Medical Dictionary,* 2006: 1968). It is a Greek word that consists of the prefix *tetra* meaning four and *plegia* meaning paralysis. The term was translated correctly by 72% of the participants. Along with the translation given in the official translated version, شلل رباعي , the following literal translations were regarded as acceptable :

(6 a) شلل بالاطراف الاربعة

(6 b) شلل رباعي تام

19% of the responses were blank, and 9% of participants experienced difficulties in giving the exact meaning of the term. Let us consider some of their responses:

(6 c) شلل ثلاثي

(6 d) شلل تام

(6 e) شلل جميع فقرات الرقبة

6c is unacceptable as the paralysis affects four parts of the body, legs and arms, not just three of them. 6d could be back-translated into English as complete paralysis, which is different from tetraplegia. 6e is completely different from the original concept, as it means the paralysis of all cervical vertebrae. These translations indicate that the participants knew that the term referred to paralysis but could not realize the accurate meaning of the term as a whole. Had they understood the meaning of the prefix *tetra*, then the participants would have recognised that the paralysis affects our parts of the body and not all the body.

Term 7 Hypermetropia

This term is a Greek word, a synonym of hyperopia (*Stedman's Medical Dictionary*, 2006: 923). The term can be broken up into three parts: the prefix *hyper* meaning above, *metro* meaning measure and *ops* meaning eye. Some scientific words are ambiguous due to their Greek or Latin origin, and some of them, like *hypermetropia*, are still hard even if the translator knows the meaning of their parts. For instance, knowing the meaning of the parts of *hypermetropia* will not help the translator to understand the exact meaning of the term, although it could help him/her know that the term is related to an eye condition. 52% of the participants managed to grasp the exact meaning, بعد نظر meaning "long-sightedness" which can be found in *Stedman's Medical Dictionary* (2006:923) with a clear explanation of the term. In the official translation the equivalent طول نظر was given and regarded as an acceptable translation.

About 28% of the participants did not manage to the exact meaning. They provided unacceptable translations such as:

(7 a) مد البصر

(7 b) ضعف نظر

(7 c) مد بصري لا بؤري

(7 d) طول نظر مع انحراف بالقرنية

(7 e) خلل بالقرنية

(7 f) حول

Out of the 15 (28%) participants who rendered this term incorrectly, 10 provided the translation in 7a. This interpretation could be attributed to the subjects' dependence on the translations given by the online *Unified Medical Dictionary* and *Hitti's Medical Dictionary* which is مد البصر, meaning "the distance of the sight", which does not reflect the exact meaning of the term in the context . 7b is incorrect as it could be back-translated as weak sight. In 7d the subjects gave two meanings for the same term which was regarded as a wrong translation. The subject started with the correct meaning of the term طول نظر, but s/he added more information about the term مع انحراف بالقرنية meaning " long-sightedness with deviation of cornea" which is medically wrong (according to *Stedman's Medical Dictionary*) so the translation was considered as wrong. 7e gave a translation that means "a problem in the cornea". A single participant rendered the term into Arabic as 'squint' which is a completely different condition. These translations show that the participants were confused by the term and did not choose the accurate meaning of the term in English. 20% of the participants could not provide any translations.

Term 8 Astigmatism

This term comes from Greek: the prefix *a-* means without and *stigma* means point. 43% of the participants translated the term as لابؤري او لا نقطي which was regarded as acceptable.

Indeed, 12 participants gave the same literal translation that was given in the official version, that is لابؤري and regarded as correct. Another 11 participants gave لانقطي which is also an accurate rendering. Both translations ' لا بؤري and لا نقطي gave the same meaning which literally means without a spot or without a point. It is clear that the literal translation of the original meaning of the term was adopted as an acceptable translation in the source, as well as in *Hitti's Medical Dictionary* and in the *Unified Medical Dictionary*. *Stedman's Medical Dictionary* (2006:170) gives this definition for the term:

> *"A condition of unequal curvatures along the different meridians in one or more of the refractive surfaces of the eye, in consequence of which the rays from a luminous point are not focused at a single point on the retina*".

The following are some examples of the unacceptable translations given by the participants:

(8 a) استيجماتيزم

(8 b) حول

(8 c) انحراف القرنية

(8 d) مد البصر

(8 e) مرض بالعيون

8a is a transliteration of the term that was given by 4 participants. Some participants may choose transliteration as a final resort to escape from the challenge to provide the exact meaning of the term. In this case, transliteration is not acceptable for two reasons: firstly the term has an equivalent in Arabic and, secondly, the transliteration of the term ستيجماتيزم is not common in Arabic. 8b means 'squint' which is not the correct equivalent. 5 participants rendered the term as "deviation of cornea" which is a different condition that affects the eyes. 8e was considered incorrect. The participants used translation by a more general word (superordinate), In this case, as the participants did not manage to make an effort to find the specific meaning of the term, they just gave مرض بالعيون "eyes' disease" as an equivalent for

astigmatism. Although astigmatism is a condition that affects the eyes, the translation was regarded as incorrect because there are many kinds of defect that affect the eyes and astigmatism is only one of them. The confusion could be attributed to the translators' failure to understand the accurate meaning of the condition in English and this affected their attempt to provide the right equivalent for the term in Arabic. 20% of the participants did not give any translations.

Term 9 Cystoplegia

Cystoplegia is a synonym of cystoparalysis which means paralysis of the bladder (*Stedman's Medical Dictionary*, 2006:485). It is a Greek word and can be divided into two parts: *cysto* meaning bladder and *plegia* meaning paralysis. 39% of the participants provided correct translations. Some participants provided the same literal translation of the term that appears in the official translation version as شلل بالمثانة "paralysis of the bladder" and some interpreted the term as فشل بالمثانة "failure of the bladder". This interpretation was accepted as correct. It means that the bladder cannot do its job which is exactly what the term means. It looks as if the subjects faced difficulties in translating this term, as 43% of the responses were blank and 19% of the participants translated the term incorrectly, providing translations such as:

(9 a) ارتخاء بالمثانة

(9 b) انسداد بالمثانة

(9 c) ضعف المثانة

(9 d) التهاب المثانه

All of the above choices are names for completely different conditions that affect the bladder. 9a can be back-translated as floppiness of the bladder, 9b is blockage in the bladder, 9c means weakness of the bladder and 9d is the equivalent of cystitis which means inflammation

of the bladder. It seems that the participants knew the meaning of the first part of the term *cysto,* but they could not grasp the accurate meaning of the last part *plegia.*

Term 10 Hospital-acquired infections

Hospital-acquired infections is a multi-element compound and can be split into two parts which are *hospital-acquired* and *infections.* Semantically, *hospital-acquired* can be called the non-head and i*nfections* is the head. The non-head can be dealt with as one concept to avoid confusion.

The results showed that this term was one of the easiest in the group as 83% of the participants gave the acceptable translation. That could be due to the clear meaning of each element of the term. Thus it was easy to provide a literal translation which was regarded as acceptable and was also given in the official translation which is العدوى المكتسبه من المستشفايات . Some participants replaced the word المكتسبه by المنقوله and some used المنتشرة instead of المكتسبه which have been accepted as correct also.

11% of the participants provided unacceptable translations. All of their unacceptable responses were a result of giving the word اللتهاب "inflammation" instead of the word عدوى "infections" as; الالتهاب الناتج من الاقامة في المستشفى . Medically, it is wrong as inflammation could be one of the results of the infection. 6% of the responses were blank.

Term 11 Malaria

Malaria seems to be one of the clearer terms in the group. It is one of the most widespread infectious diseases. For this reason the term malaria is universal. Although it has an equivalent in Arabic البرداء , the transliteration of the term ملاريا is still used (see *Hitti's Medical Dictionary* and the *Unified Medical Dictionary*). It also appears in the official translated version. About 91% of the participants gave the correct translations. 2 of the participants gave البرداء as an equivalent which was accepted as correct. 4% of the participants did not give any translation and 6% of the participants did not manage to get the

exact meaning. All of them gave عدوى مرض الملاريا "the infection of malaria" as a translation for malaria. The confusion might have happened because malaria is an infectious disease. The following is the sentence where the term appeared and it is very clear that the word *malaria* describes a disease and not an infection of the disease.

Drug resistance is also evident in diarrhoeal diseases, hospital-acquired infections, ***malaria****, meningitis, respiratory tract infections, and sexually transmitted infections, and is emerging in HIV.*

So, the concept of the context is very important in translation

Term 12 HIV

HIV is an abbreviation for the human immunodeficiency virus. The term was correctly rendered by 69% of the participants who succeeded in providing a translation that was the same as the official translation الفيروس المسبب لمرض فقد المناعة المكتسبه . Some of them gave الفيروس المسبب لمرض الايدز as the translation which was accepted as correct. 7% of the responses were blank and 24% of the participants provided unacceptable translations. They delivered translations such as:

(12 a) مرض فقد المناعة

(12 b) مرض الايدز

(12 c) نقص المناعة المكتسبة

(12 d) انعدام العوز المناعي

(12 e) اتش اي في

Options 12a, b, c and d gave the translation of AIDS using different Arabic words to explain the term. These choices could be made for two reasons: firstly, the respondents may have no idea as to what the abbreviation HIV refers to. The second reason is that the term is linked with AIDS, so the participants may confuse both terms.

A knowledge of what the 'V' refers to would make it easier for the participant to know that the term stands for a kind of virus and not a disease as they thought.

12e is a transliteration. The participants might use transliteration to resolve the problem, but it was not regarded as a correct translation as the term can be rendered into Arabic.

Term 13 Meningitis

The term can be divided into *mening* (membrane) and *itis* (inflammation), literally meaning the inflammation of the membrane. Having an idea about the meaning of the parts of the term could be helpful, but it is still not enough as one should specify which membrane. According to *Stedman's Medical Dictionary* (2006: 1183) meningitis is the inflammation of the membranes of the brain or spinal cord. A single participant gave the same explanation for the term as in *Stedman's Medical Dictionary* التهاب غشاء المخ او النخاع الشوكي which was accepted as a correct translation along with the translation in the official version التهاب السحايا .

Some gave مرض السحايا, which was accepted as a correct translation (see *Unified Medical Dictionary* and *Hitti's Medical Dictionary)*. 85% of the participants rendered the term correctly. 9% of them did not provide any translations and 6% gave incorrect translations. Some participants gave the literal translation of the term, as they may have depended on their understanding of the meaning of the prefix *mening* and the meaning of the suffix *itis*, so they ended up by giving the translation التهاب الاغشية . Some produced translations such as المكورات السحائية which is unacceptable, as it could be back-translated as meningococcal diseases which has been discussed before (see Term 5).

Term 14 Ebola

The term had a low percentage of correct choices (30%). This low percentage could imply the difficulties of translating this term. The reasons behind this difficulty could be: firstly, the term is not widely used as the disease is not very common in the Middle East and, secondly, the term cannot be found in many medical dictionaries (including the ones which the

researcher has consulted which are listed in chapter four). The following are some correct suggestions given by the participants:

(14 a) مرض ايبولا

(14 b) حمى ايبولا

Both are good translations that are close to the translation given in the official translation حمى ايبولا النزفيه. The researcher would also suggest مرض ايبولا النزفي المعدي.

It has been noticed the name Ebola was accepted to be transliterated in the correct translation because it is a name *"It is named after a river in the Democratic Republic of the Congo (formerly Zaire) in Africa, where it was first recognized".*[33]

20% of the responses were blank. The term received the highest percentage (50%) of unacceptable translations. Let us consider some of these translations:

(14 c) فيروس ايبولا

(14 d) ايبولا

(14 e) مرض فيروسي

(14 f) نوع من الفيروسات

(14) مرض يصيب جميع اجهزة الجسم و خاصة جهاز المناعة

In translations 14c, e and f the participants described Ebola as a virus, which is wrong. The following sentence where the term appeared clearly shows that Ebola is a disease.

Emerging <u>viral diseases</u> such as <u>Ebola</u>, Marburg haemorrhagic fever and Nipah virus pose threats to global public health security.

14e rendered the term as a viral disease which is medically correct, but this was still regarded as an inaccurate translation because all the diseases that appeared in the sentence are viral diseases and Ebola is one of them, so it will be more accurate if the translator writes the name

[33] http://www.cdc.gov/ncidod/dvrd/spb/mnpages/dispages/ebola/qa.htm

of the disease. With this translation the sentence will not make sense to the reader. 14f describes Ebola as a kind of virus which is wrong (as was discussed above).

According to translation 14d the word Ebola transliterated into Arabic as ايبولا. This transliteration was not accepted and was considered as wrong because the transliteration given will confuse the Arabic readers as it appears as only a name without describing or defining what it is. In 14g one subject tried to give an explanation of the term as follows "*Ebola is a disease that affects all the body's system, mainly the immunisation system"*. According to WHO's website this explanation is wrong, so it was not accepted as correct.

Term 15 Nipah virus

According to the WHO' website[34] the Nipah virus (NiV) is an emerging zoonotic virus (a virus transmitted to humans from animals). In infected people, the Nipah virus causes severe illness characterized by inflammation of the brain (encephalitis) or respiratory diseases. This severe disease also occurs in animals such as pigs, resulting in significant economic losses for farmers**.**

A high percentage of participants (65%) managed to give acceptable translations. Let us consider some of these translations:

(15 a) فيروس نيباه

(15 b) جرثومة نيباه

(15 c) فيروس نيباه المسبب لي التهاب الدماغ

Although the participants used transliteration for the term, the first choice (15a) was accepted as correct, as the word فايروس , the transliteration of the word virus, is commonly used in Arabic and could be found in English-Arabic Medical Dictionaries (see *Unified Medical Dictionary and Hitti's Medical Dictionary*) . Also the word *Nipah* cannot be translated into Arabic as it is a name. Its name originated from Sungai Nipah, a village in the Malaysian

[34] http://www.who.int/csr/diseae/ebola/en/

Peninsula where pig farmers became ill with encephalitis[35] . 15a is the same translation that was given in the official translation15b is the same as 15a: the difference is that the subjects used the other Arabic equivalent for virus جرثومة. In 15c, the participants used an explanation which added some information about the term, which made it easier to understand for the target readers.

28% of the participants did not try any translation and 7% of them did not manage to give acceptable translations. The reason for this result could be due to the fact that the participants did not know that *Nipah* is a name and that it is acceptable for it to be transliterated.

(15 d) فايروس

(15 e) مرض فيروسي

(15 f) مرض يسببه فيروس

(15 g) جرثومة

In 15d the term was transliterated as a virus; it was not accepted as the participants should deliver the same message to the target readers. It would have been more acceptable if the subjects had specified the name of the virus as there are thousands of viruses. 15e means "viral disease", whereas the term talks about a specific virus. 15f back-translates as "a disease caused by a virus" which is incorrect as the term refers to a virus and not to a disease. 15g is the same translation as 15d; the only difference is that the participants in 15g used the other Arabic equivalent for virus جرثومة .

Term 16 Pediatric Hematology Department

This is a multiple compound term which contains more than two elements. 63% of the participants gave the correct translation قسم امراض دم الاطفال, which is close to the translation given in the official translation قسم امراض الدم للاطفال.

[35] http://www.cdc.gov/ncidod/dvrd/spb/mnpages/dispages/nipah.htm

The second element *hematology* exposed the core difficulty. 20% of the participants did not try to give any translation and about 17% produced inappropriate translations. All of their options indicated a problem in translating the second element *hematology*. They provided translations such as:

(16 a) قسم علم دراسة دم الاطفال

(16 b) قسم فحص دم الاطفال

(16 c) قسم تشخيص دم الاطفال

(16 d) قسم دراسة الدم للاطفال

(16 e) قسم تحليل دم الاطفال

The above translations show that the participants translated *hematology* by giving different Arabic equivalents. In 16a and d, they depended on understanding the meaning of *hema* "blood" and *ology* "study of", so they gave the literal translation which is علم دراسة . This shows that the participants looked at the word level without recognising the semantic relationship between the elements of the compound. In 16b, c and e the participants rendered the term as تحليل الدم او تشخيص الدم "blood test". The above translations were regarded as unacceptable. The *pediatric hematology department* is the place where children with blood diseases are checked, reviewed and looked after[36]. It seems that the participants who got the phrase wrong do not know exactly which department the compound refers to.

Term 17 Neurologists

The word neurologists can be divided into *neuro* meaning nerve and *ologists* meaning the people who are specialist in neurology. It is the branch of medical science concerned with the various nervous systems (central, peripheral and autonomic), in addition to the neuromuscular junctions and muscles and their disorders (*Stedman's Medical Dictionary*, 2006:1311). The suffix *ists* changes the word *neurology* to refer to the people who are

[36] See http://www.uihealtcare.com/depts/med/pediatrics/divisions/hemonc/index.html

specialists in neurology. Although the context where the term appears shows that the term *neurologists* refers to the consultants who specialise in nerve conditions, many participants gave علم الاعصاب as a translation for neurologists. The following is the context where the term appeared:

Health professionals including **neurologists,** and physiotherapy, occupational therapy and speech therapy are involved.

Based on this context, the underlined item is the key word which was supposed to be tackled in the first place before the key term. 67% of the participants gave unacceptable translations, 33 out of 36 (92%) gave علم الاعصاب as a translation which could be back-translated into neurology. The reason for this high percentage could be due to the fact that the subjects did not depend on the context of the sentence and were confused between *neurology* and *neurologists*. 13% of the responses were blank. 20% of the participants managed to resort to the context and provided acceptable translations such as ,طبيب الاعصاب or اخصائيين الامراض العصابيه as was given in the official translated version (also in *Unified Medical Dictionary and Hitti's Medical Dictionary*)

Term 18 Physiotherapy

Physiotherapy is a Greek word which consists of two parts: *physio* meaning nature and *therapy* meaning treatment. The term looks to be one of the easiest terms in the Table as a high percentage (85%) of the participants delivered acceptable interpretations that are similar to the translation given in the official translation العلاج الطبيعي . Some of them gave المعالجة الطبيعية and some arabicized the term as العلاج الفيزيائي Both were accepted as correct translations. Unacceptable translations were given by 7% of the participants. Let us consider some of their interpretations:

(18 a) علاج عضوي

(18 b) علاج وظيفي

(18 c) علاج تأهيلي

In 18a the participants translated the term as علاج عضوي which literally means "organic treatment". The participants seem to have failed to distinguish between organic and physio. 18b علاج وظيفي could be back-translated as occupational therapy which is a different health department. In 18c the participants gave an adaptation as an equivalent for the first part of the term. These translations exhibit a misunderstanding of the kind of treatment that physiotherapy provides. 7% of the responses were blank.

Term 19 Occupational therapy

Before there is a discussion of this term, it is interesting to know what the term means in the medical field. According to NHS website[37], occupational therapy is the assessment and treatment of physical and psychiatric conditions using specific, purposeful activity to prevent disability and promote independent function in all aspects of daily life. In other words, it refers to the treatment given to patients with disabilities to prepare them to perform their functions in all aspects of daily life.

The term was literally translated as علاج مهني in the official translation which reflects the meaning of the term, and thus is considered as correct. 57% of the participants provided acceptable translations. Some of them gave علاج مهني , the translation given in the official translation version. Some have interpreted the term as علاج وظيفي which was accepted as correct also. The results show that 30% of the responses were incorrect as in:

(19 a) العلاج بالعمل

(19 b) معالجة بالعمل

(19 c) المدواة بالاشغال

(19 d) علاج تأهيلي

[37] http://www.nhscareers.nhs.uk/details/default.aspx?=284

The above suggestions show that the participants faced difficulty in finding an appropriate Arabic equivalent for the first element of the term, *occupational*. The reason for these confusions could be due to the fact that the participants linked the element to engagement in work. 19a, b and d were delivered on the basis that occupational therapy involved treatment through work, as in 19d, where the first element "occupational" is rendered as “preparatory” تأهيلي . This might be attributed to the fact that occupational has different meanings; however, it is the job of the translator to choose the right meaning relating to the medical field. 13% of the responses were blank.

Term 20 Immunisation

This term appeared to be clear and easy to translate. Indeed, this term achieved a high percentage of correct translations (62%). The translation لقاح was provided by some participants (35% of acceptable translations). The official translation and many of the subjects (65% of acceptable translations) gave تطعيم as an Arabic equivalent and this was regarded as acceptable also.

But the translation of the term still gave rise to concern, as 31% of participants produced unacceptable translations. Let us consider some of their options:

(20 a) المناعة

(20 b) تمنيع

(20 c) الوقاية

The above were not considered as accurate translations, as they could be back-translated as follows: 20a immunity, 20b to immunise, 20c prevention. These inaccurate choices could be related to the fact that *immunisation* is derived from immunity and the participants know that, not realizing that the suffix *sation* changes the word to give a different meaning. 20c is not acceptable as prevention is different from immunisation, which means the protection of susceptible patients from communicable diseases by the administration of a living modified

agent (*Stedman's Medical Dictionary*, 2006: 951). The reason for providing these unacceptable translations could be due to the fact that the participants may have been confused between the meaning of immunisation and prevention in Arabic, so they failed to choose the correct Arabic equivalent for the term. 6% of the responses were blank.

Term 21 Plague

This term was the least problematic and accounted for one of the highest percentages of correct translations (94%) with 6% blank responses. This good result can be attributed to the transparency of this single form term which can be found in many English-Arabic dictionaries (see *Unified Medical Dictionary and Hitti's Medical Dictionary*). Thus, most of the participants put the correct equivalent which is الطاعون as it was shown in the official translation.

Term 22 AIDS

AIDS is an abbreviation for Acquired Immune Deficiency Syndrome. It exhibits a very high correct percentage (94%) and not a single unacceptable translation was given with only 6% of blank responses. The reason why the term did not offer much difficulty may be related to: (1) the arabicized form الايدز , which was given by many participants (90% of acceptable responses) , is commonly used in Arabic (see *Unified Medical Dictionary and Hitti's Medical Dictionary*) and is accepted as an accurate translation, and (2) the disease is universal and it is known to the public by two common Arabic equivalents الايدز which was mentioned above and مرض فقد المناعة المكتسبة which is a translation for Acquired Immune Deficiency Syndrome. In the official translation version مرض الايدز was given as a translation for the term AIDS.

Term 23 MRI

MRI is an acronym for magnetic resonance imaging. 74% of the responses were acceptable and produced an exact meaning of the term,التصوير بالرنين المغناطيسي which is as the same

translation that was given in the official translated version. These results could be attributed to the transparent meanings of the individual elements of the compound.

Although the term is quite transparent as it consists of three clear elements, 17% of the participants could not grasp the idea behind the term and thus provided translations such as:

(23 a) الرنين المغناطيسي

(23 b) تصوير المرنان المغناطيسي

(23 c) وحدات تصوير الصوت الممغنطة

(23 d) ام ار اي

23a involves the omission of the last element of the term i*maging*. This translation was provided by 4 participants (44% of the wrong responses). 23b does not express the right meaning for the target reader as the second element المرنان is not an accurate translation of *resonance*. 23c is completely different from what is meant by the term as it includes the word الصوت "sound" instead of الرنين "resonance". 23d is a transliteration of the term which was not accepted as a correct translation for two reasons; firstly, the term has an Arabic equivalent, and secondly the transliteration of the term is not commonly used in Arabic. These translations could be explained by the fact that the participants did not succeed in providing the correct semantic relationships between the elements of the term in Arabic. 9% of the participants did not try any option.

Term 24 Thalassemia

50% of the participants rendered the term correctly; 18 of them (66%) gave the transliteration ثلاسيميا as an Arabic equivalent and it was accepted as correct because it is still used in Arabic and can be found in some Arabic dictionaries (see the *Unified Medical Dictionary* and *Hitti's Medical Dictionary).* Others gave the correct meaning of the term in Arabic (see *Hitti's Medical Dictionary)*, as:

(24 a) انيميا البحر الابيض المتوسط

(24 b) فاقة البحر المتوسط

A high percentage of responses (35%) were blank and 15% of the participants produced unacceptable translations such as:

(22 c) مرض بالدم

(22 d) انحلال بالدم

Both were regarded as unacceptable translations. The first option means a blood disorder, but the term talks about a specific type of blood disorder. The second translation refers to the decay of blood. These translations suggest that the participants did not have any idea about the meaning of the disorder in the source language. This is reflected in their translations of the term into Arabic.

Term 25 Aspiration

The results show that this term was one of the most difficult terms in the group that the participants faced. The following translations are some of what were considered as accurate translations provided by only seven participants:

(25 a) القصبه الهوئية الاطعمة او السوائل من الفم الى دخول بعض

(25 b) الشرقة

25a is an explanation, meaning that some food or liquid enters the trachea through the mouth. Aspiration, which is the passage of food or liquid through the vocal folds (the sensation of food "going down the wrong way"), can be a serious consequence of dysphagia. It may cause chronic coughing, choking or airway obstruction, when food is aspirated into the lungs[38]. 25b is the Arabic word for the above process.

67% of the participants provided inaccurate translations. The reason for this result could be due to the fact that the term has different equivalents in Arabic and the participants could not

[38] See http://www.entcolumbia.org/dysphag.html

manage to choose the exact one for this medical term. Let us illustrate some of their translations:

(25 c) سحب

(25 d) شفط

(25 e) تنفس

(25 f) طموح

All the above are equivalents for the word aspiration but they are not the intended meaning for the term in Arabic. 25c and b have the same meaning, "removal by suction", which was given by 13 participants (36% of the incorrect choices). The participants may have consulted the *Unified Medical Dictionary* or *Hitti's Medical Dictionary*. Their translations were considered as unacceptable because, from the sequence of the text, it is clear that *aspiration* is the concern and not the treatment. This was shown in the following sentence where the term appeared:

Problem: concerns regarding **aspiration**

25e was given by 9 of 36 participants which could be back-translated as breathing. 25f is one of the Arabic equivalents for aspiration meaning "ambition" which does not refer to the term in the sentence.

A single participant translated the term as له علاقة بالاسبيرين "related to Aspirin".

Clearly, the above translations show that the participants could not grasp the accurate meaning for the term for two possible reasons: (1) the term has different meanings in Arabic; (2) the participants did not concentrate on the sequence of the text where the term appeared, so they failed to provide the exact equivalent. Also, a knowledge of medical field is needed in such cases.

20% of the participants did not offer any options.

Term 26 Demyelinating neuropathy

Demyelinating neuropathy is one of the terms which had a low percentage of correct translations (7%). Only four participants (7%) produced correct meanings for the term. These were:

(26 a) مرض عصابي نتيجة فقدان غشاء العصب الواقي

(26 b) فقدان غشاء العصب الواقي

(26 c) مرض فقد غشاء الميلانيين العصبي

(26 d) مرض يصيب الخلايا العصبيه بسبب فقدانها الغلاف المحيط بها

"A demyelinating disease is any condition that results in damage to the protective covering (myelin sheath) that surrounds nerve fibers in your brain and spinal cord. When the myelin sheath is damaged, nerve impulses slow or even stop, causing neurological problems.[39]*"*

The reason for this low percentage could be due to the fact that the compound could not be found in medical dictionaries. 69% of the participants faced difficulties in grasping the accurate meaning of this term, thus giving interpretations such as:

(26 e) مرض عصابي

(26 f) مزيل الاعتلال العصبي

(26 g) اعتلال عصبي بسبب عدم وجود النخاعين

(26 h) خلل عصبي في تكسير الميلانيين

(26 i) مرض تصلب الاعصاب

The first choice was given by 20 participants (37% of unacceptable translations) which can be back-translated as "neuropathy". This translation could be attributed to the fact that the participants experienced difficulty in finding an Arabic equivalent for the first element *demyelinating*, so they tried to sort out the problem by using the omission strategy that led to losing an important meaning of one part of the concept. It was accounted as an unacceptable

[39] See http://www.mayoclinic.org

translation because *demyelinating neuropathy* is a specific kind of neuropathy. 26f literally means eliminator of neuropathy; the participants may have used Google translation to get this translation. Thus, this translation was included with the incorrect interpretations. 26g is an explanation of the concept that involved the addition of some information اعتلال عصبي بسبب عدم وجود النخاعين which means neuropathy as a result of losing the myelin. This is a bad attempt to clarify the meaning of the term by explaining it without medical knowledge. Here, the participants might have consulted *Hitti's Medical Dictionary* for the meaning of *myelin* as a single word and the prefix *de*. This option (26g) was also given in the official translated version but was regarded as unacceptable. 26h is an incorrect explanation for the term as the participants gave a wrong explanation for the element *demyelinating.* 26i is a different kind of neuropathy. The element demyelinating represents the core problem in rendering the term. 24% of the responses were blank.

Term 27 Retinopathy

Retinopathy can be divided into two parts *retino الشبكيه* and the suffix *pathy علة او مرض* which literally means علة او مرض بالشبكية and is an acceptable translation.

61% of the responses were correct. They yielded the translation as:

(26 a) اعتلال بالشبكية

(27 b) خلل بالشبكيه

(27 c) مرض بالشبكيه

All of the above translations refer to *retinopathy*. The participants used different Arabic words to express the element *pathy* اعتلال و خلل و مرض which all give same meaning for the concept. In the official translation version مرض بالشبكيه was given as a translation.

Although it is a simple term and literally translated in many English-Arabic dictionaries such as the *Unified Medical Dictionary* and *Hitti's Medical Dictionary*, 20% of the participants provided an incorrect translation. Surprisingly, most of them gave cornea "القرنية" as an

equivalent for the first element *retina.* The reason behind this confusion could be due to the participants' lack of knowledge about the different parts of the eye (retina and cornea) and that they did not check the term in an English-Arabic medical dictionary. Some focused on the first element *retino* and omitted the second element *pathy* giving الشبكيه "retina" as a translation which was considered as unacceptable. About 19% of the participants did not give any translation.

Term 28 SARS

SARS is an abbreviation for Severe Acute Respiratory Syndrome. 31% of the participants produced correct translations such as:

(28 a) التهاب رئوي لانمطي

(28 b) التهاب رئوي حاد

(28 c) السارس و هو مرض التهاب الرئوي اللانمطي

(28 d) السارس مرض يصيب الجهاز التنفسي نتيجة لفيروس

28a was also given in the official translation.

The main problem with this term is that some participants used the transliteration of the abbreviation سارس which was not accepted as accurate because the term already has an equivalent in Arabic الالتهاب الرئوي اللانمطي . Also, the transliteration of this abbreviation is not commonly used in Arabic. 43% of the participants delivered incorrect interpretations, and 16 subjects (about 30% of the incorrect translations) gave the transliteration of the term سارس as an equivalent. The others provided translations such as:

(28 e) فيروس سارس

(28 f) انفلونزا الطيور

28e refers to the virus that causes SARS which is wrong. In 28f the participants became confused and put انفلونزة الطيور "bird flu" as a translation for SARS. This confusion may have

occurred as both diseases spread during the same period (in the last ten years) and they both affect the respiratory system. 26% of the responses were blank.

Term 29 Smallpox

The Table shows that *smallpox* was one of the easiest terms as it scored a high percentage of correct translations (94%). Only one participant produced an unacceptable translation which was الفيروس المسبب للحصبه "the virus which causes measles". 2 responses were blank. The reasons for this percentage could be (1) the disease is common around the world and (2) the term has an Arabic equivalent الجدري which could be found in many Arabic-English dictionaries. الجدري was also given in the official translation.

Term 30 Anthrax

This scored a high percentage of acceptable translations (81%). It has an Arabic equivalent الجمرة الخبيثة . The term could be found in many Arabic-English medical dictionaries such as *Hitti's Medical Dictionary* and the *Unified Medical Dictionary.* Despite the term appearing in these dictionaries, errors accounted for 17%. 9 participants produced three different translations:

(30 a) البكتريا المسببة للجمرة الخبيثة

(30 b) الجمرة

(30 c) الانثراكس

In 30a the participants seem confused between the disease and the bacterium which causes the disease, "Bacillus anthracis". 30b was considered an unacceptable translation as it could be back-translated as coal " الفحم او الجمر" . Also, this unacceptable translation could affect the meaning of the sentence where the term appeared:

*The **anthrax** attack had huge economic, public health and security consequences.*

30a is an arabised form of the term which was not accepted. The term is not common in Arabic but has an Arabic equivalent. In addition to the official translation version الجمرة الخبيثة

some participants gave مرض الجمرة الخبيثة as a translation and this was regarded as acceptable too.

Term 31 Catheter

This term is quite clear as it consists of one element that can be found in many English-Arabic medical dictionaries. Given this fact, only one participant could not grasp the exact meaning of the concept and thus delivered a translation which was انبوب "tube". The participant may have known the word catheter but could not manage to give an Arabic equivalent for it. She/he could have given an accurate translation if she/he specified the job of the tube as انبوب لتصريف البول . This translation (انبوب لتصريف البول) was given by 5 participants (12% of the acceptable translations which were 78% in total). 37 participants rendered the term as القسطرة (the translation that was given in the official translation version). 20% of the responses were blank.

Term 32 Orthoptic clinic

59% of the participants managed to give accurate translations. Here are some of them:

(32 a) عيادة تقويم العيون

(32 b) عيادة تصحيح النظر

(32 c) عيادة تقويم البصر

(32 d) عيادة عيون

The last option is the same as the one that was given in the official translation version.

28% of the participants rendered this term wrongly. 13 out of 15 provided the translations:

(32 e) عيادة العظام

(32 f) عيادة تجبير العظام

(32 g) عيادة تقويم العظام

The above translations mean *orthotic*. It seems that the participants were confused between *orthoptic* and term 1 *orthotic* as they have similar spellings. The other 2 participants failed to

provide an accurate translation and gave a translation عيادة تقويم الحول "squint correction" which was regarded as incorrect. The reason behind this wrong option could be that the participants do not know that a squint correction is one of the eye problems that are treated in this clinic. 13% of the participants did not give any options.

Term 33 Paediatrician

Paediatrician was one of the least problematic terms. It accounted for one of the highest percentages of acceptable translations (83%) and one of the lowest unacceptable (13%) and blank percentages (4%). 4 out of 7 unacceptable translations were طبيب which means surgeon or any doctor who treats patients in a hospital or clinic. But pediatrician refers to a doctor who treats children طبيب اطفال . This translation was also given in the official translation version. There were other translations which were provided by the participants and were regarded as acceptable:

(33 a) اخصائي اطفال

(33 b) دكتور اطفال

Term 34 Tuberculosis

This term achieved the lowest percentage of unacceptable translations as none of the responses were wrong. 22% of the responses were blank. About 78% of the participants produced two acceptable translations السل ا و الدرن . This result could be attributed to the fact that the disease is common around the world and has an Arabic equivalent for it which can be found in many English-Arabic medical dictionaries. السل was the translation that was given in the official translation.

Term 35 Bovine spongiform encephalopathy

Bovine spongiform encephalopathy is commonly known as mad cow disease[40]. 57% of the participants provided two correct translations for the term, مرض جنون البقر which is commonly

[40] See http://kidshealth.org/kid/talk/qa/mad

used in Arabic and was given in the official translated version and اعتلال الدماغ البقري which was considered as acceptable. 28% of the responses were blank and about 15% of the participants provided unacceptable translations. The following are some of the unacceptable options:

(35 a) الشكل اعتلال دماغي بقري اسفنجي

(35 b) خلل دماغي

(35 c) مرض ينتج عنه ان خلايا المخ تصبح كالاسفنج

35a involves a literal translation of the term. It seems that the participants could not find the meaning of the compound in Arabic-English medical dictionaries so they resorted to the literal translation as an easy option which was not acceptable in this case. 35b can be back-translated as neuropathy. In 35c the participants resorted to an explanation to overcome the problem. This explanation was regarded as unacceptable. Bovine Spongiform Encephalopathy (BSE) is *"a transmissible, neurodegenerative, fatal brain disease of cattle*[41]*"*.

Term 36 Flu jab

Flu jab is a compound consisting of two simple elements *flu* and *jab*. 37% of the participants managed to grasp the exact meaning of the term لقاح ضد الانفلونزا or some gave تطعيمة البردة الموسيمية as a translation which was regarded as acceptable. These translations were similar to the official translation لقاح الانفلونزا . The participants may have relied on the context where the term appeared and succeeded in giving the exact meaning. Consider the following sentence where the term appeared:

*The **flu jab** is free and available between September and early November.*

Yet, 39% of the participants experienced difficulties in grasping the accurate meaning of this concept. Let us discuss some of their options:

[41] See http://www.who.int/mediacentre/factsheets/fs113/en/

(36 a) لقاح الحمة

(36 b) انفلونزا

(36 c) لقاح

(36 d) فترة الاصابة بالانفلونزا

(36 e) عدوى الانفلونزا

The above choices indicate that the participants' translations could be divided into two different groups. The first group grasped the meaning of the first element *flu* but failed to grasp the meaning of the last element *jab* as in 36b, d and e. The second group managed to give the meaning of the second element *jab* but they could not manage to give the meaning of the first element *flu*. 12 out of the 15 (80%) responses involved the errors that belong to the first group. It seems that the polysemous element *jab* is the problematic part of the compound. This made the participants confused as to what to choose as the appropriate equivalent for *jab* which goes with the element flu. In addition to this being a problematic word, the compound itself cannot be found in medical dictionaries, so the participants may resort to using literal translation.

Term 37 Neuropathy

Neuropathy is a Greek word consisting of *neuro-* "nervous" and the suffix *pathos* "suffering". It occasioned a high percentage of acceptable translations (76%). The participants provided three different acceptable translations (see *Hitti's Medical Dictionary)*:

(37 a) مرض عصابي

(37 b) خلل بالاعصاب

(37 c) اعتلال عصبي

37a was the same translation that was given in the official translated version. The term is clear and could be found in many Arabic-English dictionaries. Also, understanding the meaning of the parts of the term in Arabic would help in understanding the meaning of the

term. These could be the reasons for the high percentage of correct results. Only two participants (4%) gave unacceptable translations which were:

(36 d) ضعف الاعصاب

(36 e) علاج الاعصاب

The first choice means weakness of the nerves. The second translation means treatment of the nerves. It seems that both these subjects understood the meaning of the prefix *neuro-* but they could not manage to give the meaning of the suffix *pathy.* 20% of the participants did not provide any choice.

Term 38 Videofluoroscopy

Videofluoroscopy is a very technical term. It exhibited the lowest rate of acceptable translations (2%). Only one participant managed to give an exact interpretation while unacceptable translations constituted about 63% of the responses. The following are some of the unacceptable choices:

(38 a) منظار

(38 b) فيديو التنظير

(38 c) منظار فلوري

(38 d) فيديو الكشف الفلوري

From the above options it can be noticed that in 38a and b the participants were confused between *fluoroscopy* and *videofluoroscopy* (see *Hitti's Medical Dictionary*, 2005: 162 for the meaning of fluoroscopy). 38b was given in the official translation version. In 38c and d, it seems that the participants tried to resolve the problem by using literal translation, which was considered unacceptable. These results could be attributed to the fact that the subjects may not know the meaning of the concept in English. Also, they could not grasp the meaning from the context. The following is the context where the term appeared:

*The patient had a **videofluoroscopy** examination to further assess her feeding and swallowing skills.*

The correct interpretation that was given by only one participant was:

جهاز فحص يستخدم لمتابعة البلع

This interpretation is approved by the NHS website[42] *videofluoroscopy is an X-ray that looks at the way your swallowing works.*

35% of the responses were blank.

Term 39 Fundoplication

Fundoplication displayed a low rate of correct translation (about 13%) and the second highest rate of blank responses (48%). Also, it exhibited a high percentage of unacceptable translations (about 39%). Only 7 participants provided acceptable translations such as:

(39 a) تضييق بوابة المعدة و تدعيمها بالجزء الاسفل للمريء

(39 b) خياطة الجزء العلوي من المعدة حول اسفل المريء (عملية جراحية)

(39 c) عملية تضييق المريء من جهة المعدة

Let us consider examples of the unacceptable translations:

(39 d) المريء

(39 e) جراحة المريء

(39 f) جراحة المعدة

These choices indicate that the participants were unable to grasp the correct meaning of the term in English (SL) so they provided unacceptable translations. In 39d the participants gave المريء "gullet" as a translation. 39e means gullet surgery while 39f means stomach surgery. These options do not convey the specialized sense of the term, as the term talks about a specific type of operation. According to *Stedman's Medical Dictionary* (2006: 777)

[42] www.rbht.nhs.uk/patients/condion/vidiofluorscopy

"fundoplication is suture of the fundus of the stomach completely or partially around the gastroesophageal junction to treat gastroesophageal reflux disease."

Term 40 Gastrostomy

Gastrostomy can be divided into two parts *gastr* means stomach and *tomy* means incision. It means the establishment of a new opening into the stomach (*Stedman's Medical Dictionary*, 2006:793). 16 participants (29%) gave some acceptable translations which were:

(40 a) ثقب بالمعدة

(40 b) عمل فتحة بالمعدة

(40 c) عملية فتح ثقب بالم عدة

About 26% of the responses were blank and 44% of the participants failed to give acceptable translations. They provided options such as:

(40 d) المعدة

(40 e) عملية جراحية للمعدة

(40 f) فتح المعدة

(40 g) استئصال جزاء من المعدة

The above translations suggest that the participants may not know the actual meaning of the term in the SL (English). 40 d "stomach" was given by 14 participants (58%). It seems that they knew the first part of the term *gastr*, but could not manage to grasp the meaning of the last part *tomy*. 40 e and f refer to stomach operations. 40 g talks about removing a part of the stomach.

Term 41 Haemophilia B

Haemophilia B is a genetic (inherited) condition that affects the blood's ability to clot[43]. Although it has an Arabic equivalent which is الناعورة ب (see *Hitti's Medical Dictionary*,

[43] http://www.nhs.uk/condions/Heamophilia/pages

2005:178), 33% of the participants did not try any options and 22% of the responses were unacceptable. Let us consider examples of these unacceptable translations:

(41 a) الهيموفيليا بي

(41 b) سيولة الدم

(41 c) نزيف

41a is the arabization of the term which was not considered as acceptable because there is an Arabic equivalent for the term. 41b describes the state of the blood of a patient who has the disease (haemophilia B) and was not accepted as an accurate translation. 41c could be back-translated as bleeding and was considered as an unacceptable translation. It seems that the subjects may understand the meaning of the term but they could not manage to produce either the exact explanation or the correct equivalent in Arabic. 44% of the participants delivered three acceptable translations:

(41 d) الناعورة ب

(41 e) مرض نزف الدم الوراثي

(41 f) مرض ينتج عن نقص في عامل التجلط الثامن

41 e and f were considered as acceptable explanations of the term and so were accepted as correct translations.[44]

Term 42 Immunology assessment

The Table shows that this term is one of the easiest to translate in the group. Only one participant (2%) provided an unacceptable translation, which was تقييم علم المناعة. She/he might have consulted a dictionary to check the meaning in Arabic for each of the elements of the compound and then give a literal translation. Also, it seems that the participant could not grasp the meaning of the term from the context where the compound appeared:

*The patient is waiting for **an immunology assessment**.*

[44] See http://www.nhs.uk/condions/haemophilia/pages/introducion

9 responses were blank (16%). The results show that a high percentage of the responses (81%) were considered as acceptable. The following are examples of these translations:

(42 a) تقييم المناعة

(42 b) اختبار مناعة الجسم

(42 c) فحص جهاز مناعة الجسم

Term 43 Ophthalmologist

Ophthalmologist is one of the four terms in the group which did not receive any unacceptable answers. About 28% of the participants did not provide any translations. A high percentage of the participants (72%) provided three different acceptable translations:

(43 a) اخصائي عيون

(43 b) طبيب عيون

(43 c) اخصائي امراض عيون

The context where the term appeared could be the reason behind this result. Let us consider the context:

*The patient was referred to the consultant paediatric **ophthalmologist** at the eye hospital.*

The underlined words could provide the clues for the subjects who got the exact meaning of the term.

Term 44 African Trypanosomiasis

Although only 3 participants (about 6%) did not manage to get the acceptable translation, about 54% of the responses were blank. This percentage is the highest of the blank translations in the group which indicates the difficulties of rendering this term into Arabic. There were two unacceptable translations which were given by the subjects. One of them involved using arabization to resolve the problem تريبناسوميز الافريقية . This transliteration was not accepted as the term has an equivalent in Arabic. The second option was given by two participants and was داء الطفيليات الافريقي, which can be literally back-translated as African

parasites' disease. It seems that the subjects could not grasp the meaning of the term in English and thus provided a medically wrong meaning (according to *Stedman's Medical Dictionary*, 2006:2040) in Arabic.

About 41% of the participants provided two different correct translations which were:

(44 a) داء المثقبيات الافريقي

(44 b) مرض النوم

Term 45 Haemoglobinopathies

Haemoglobinopathies is one of the terms in the group which was less problematic. It accounted for a high percentage of acceptable translations (74%) and a low percentage of incorrect choices (7%) and about (19%) of blank responses. These results could be attributed to the transparent meanings of the parts of the term as the term could be divided into two parts haemoglobin هيموجلوبين and pathies اعتلالات او اختلالات . Thus, most of the participants (82% of correct translations) managed to give the acceptable translation اختلالات الهيموجلوبين . There were other suggested translations given by the participants that were regarded as acceptable, e.g:

(45 a) اختلالات بيخضور الدم

(45 b) امراض و اعتلا ل بخضاب الدم

(45 c) امراض الدم التي تظهر نتيجة خلل في التركيب الجيني للهيموجلوبين

In 45a and b the subjects used خضاب الدم و يخضور الدم , which are both Arabic equivalents for haemoglobin. In 45c, the participants used the transliteration for the term *haemoglobin* هيمجلوبين with an acceptable explanation for the term[45]. Four participants delivered incorrect translations such as:

(45 d) خلل في عوامل الثختر

(45 e) نسبة الهيموجلوبين

[45] http://www.hbregistry.org.uk/information/haemoglobinopathies

امراض الدم (45 f)

The above translations show that the participants were unable to give the right meaning of the term. This could be attributed to the fact that the participants did not know the meaning of the condition in English.

The answers to the open questions at the end of the questionnaire showed that 98% of the participants consulted medical dictionaries to find the answers for the questionnaire sets. 67% of the 98% believe that the medical dictionaries they used were not helpful. This can help in explaining why many of the participants struggled to find the meaning of some compound medical terms, abbreviations and terms that have no existing equivalents in Arabic. Also, some participants who consulted medical dictionaries gave unacceptable answers because they depended only on the meaning of the term as it appeared in the dictionary and ignored the context of the sentence.

5.2.1.2 Analysis of Professional Translators' Answers (Sample Two)

Table 5 shows the results from the professional translators' responses. It is formatted in the same way as Table 4, so it will be easy for the reader to compare the results of the students' answers in Table 4 and the professional translators' answers in Table 5. The explanations of each term have been discussed in the analysis of students' answers (see 5.2.1.1), so, to avoid repetition, they will not be represented in the discussions of the professional translators' answers.

Table 5: Percentage Results of the Translations of Medical terms (Given by professional translators)

N	Medical Terms	Acceptable translation %	Unacceptable translation %	Blank %
1	Orthotic	92	-	8

	appointment			
2	Outpatient appointment	100	-	-
3	Phlebotomy	75	25	-
4	Cholera	100	-	-
5	Meningococcal diseases	92	8	-
6	Tetraplegia	100	-	-
7	Hypermetropia	75	25	-
8	Astigmatism	83	17	-
9	Cystoplegia	100	-	-
10	Hospital-acquired infections	100	-	-
11	Malaria	100	-	-
12	HIV	100	-	-
13	Meningitis	100	-	-
14	Ebola	100	-	-
15	Nipah virus	92	8	-
16	Pediatric hematology department	92	8	-
17	Neurologists	100	-	-
18	Physiotherapy	100	-	-
19	Occupational	92	8	-

	therapy			
20	Immunisation	100	-	-
21	Plague	100	-	-
22	AIDS	100	-	-
23	MRI	100	-	-
24	Thalassemia	67	33	-
25	Aspiration	58	42	-
26	Demyelinating neuropathy	50	50	-
27	Retinopathy	100	-	-
28	SARS	100	-	-
29	Smallpox	100	-	-
30	Anthrax	83	17	-
31	Catheter	100	-	-
32	Orthoptic Clinic	92	8	-
33	Paediatrician	100	-	-
34	Tuberculosis	100	-	-
35	Bovine spongiform encephalopathy	100	-	-
36	Flu jab	100	-	-
37	Neuropathy	100	-	-
38	Videofluoroscopy	67	33	-
39	Fundoplication	67	33	-
40	Gastrostomy	92	8	-

41	Haemophilia B	67	33	-
42	Immunology assessment	100	-	-
43	Ophthalmologist	100	-	-
44	African trypanosomiasis	92	8	-
45	Haemoglobinopathies	100	-	-
	Total	4125	364	8
	Total Mean %	92	8	0

The table shows that the professional translators successfully translated most medical terms (92% of acceptable translations). Most of the 8% of unacceptable translation were given by inexperienced translators. In the following section, the medical terms which have more than 0% of unacceptable translations will be explained. They will be taken up in turn to highlight the problems associated with translating each one of them. The answers of the translators for each term will be given.

Term 3 Phlebotomy

25% of the participants gave unacceptable translations. Their answers were; فصد . They may have depended on the translation given on G*oogle* and *UMD*, which is considered unacceptable according to some monolingual medical dictionaries (see 5.2.1.1). 75% of the participants delivered acceptable translations. They may have either relied on the context of the sentence or the term was already known for them through their experience.

Term 5 Meningococcal diseases

8% gave التهاب السحايا as a translation for the term which could be back translated into English as *meningitis.* It seems that the translators may have been confused as both terms relate to meningitis (see 5.2.1.1). 92% of the translators rendered the term correctly as الاوبئة السحائية.

Term 7 Hypermetropia

25% of the responses translated the term as مد البصر , which was considered as an unacceptable translation. It is the same translation that is given in *UMD and Hitti's Medical Dictionary,* which explain the term as depending on its elements *hype, metro* and *ops* (see 5.2.1.1). 75% of the translators managed to give the correct meaning of the term which is long-sightedness طول نظر او بعد نظر .

Term 8 Astigmatism

17% of the answers were unacceptable. They transliterated the term into Arabic as ستيقماتيزم, although the term has an equivalent in Arabic لا بؤري or لا نقطي (see 5.2.1.1).

Term 15 Nipah virus

Only 8% of the participants gave an unacceptable translation which is مرض فيروسي. It means viral disease. So, the term can be transliterated into Arabic as a specific viral disease (see 5.2.1.1). Most of the participants (92%) rendered the term correctly into Arabic.

Term 16 Pediatric Hematology Department

8% of the translators translated the term as قسم علم دراسة طب الاطفال. It is a literal translation and regarded as unacceptable. As the term could not be found in dictionaries as it is a compound (see 5.2.1.1), the translators may have tried to give the meaning for each element of the term individually. A high percentage (92%) of the translators managed to give an acceptable translation which is قسم امراض الدم عند الاطفال

Term 19 Occupational therapy

Although the term is very common in the medical field, 8 % of the translators failed to give the acceptable translation for the term. They translated the term as علاج الشغل. They may have focused on the first element and linked it to the work (see 5.2.1.1). Most of the participants(92%) gave acceptable translations of the term such as: علاج وظيفي , علاج مهني.

Term 24 Thalassemia

33% of the participants rendered the term as *anaemia* فقر دم , which was considered as an unacceptable translation because the term refers to a specific kind of *anaemia* and it has an equivalent in Arabic (see 5.2.1.1). 67% of the translators succeeded in giving acceptable translations such as تلاسيميا which is a transliteration of the term and commonly used in Arabic (see *The Unified Medical Dictionary* and *Hitti's Medical Dictionary)*

Term 25 Aspiration

42% of translators gave different medically inappropriate translations for the term such as شفط سحب .These translations can be found in dictionaries but cannot convey the intended meaning of the term. It is a high percentage of unacceptable translations to be given by professional translators. As the term has more than one equivalent in Arabic (with different

meanings), only 58% of the participants managed to choose the right equivalent of the intended term in Arabic (see 5.2.1.1).

Term 26 Demyelinating neuropathy

50% of the professional translators did not succeed in giving an acceptable translation for the term. This high percentage reflects the problem of translating compounds that cannot be found in dictionaries and CAT tools do not provide any help in translating this term. Most of them gave مرض عصابي *neuropathy* as a translation for the term which was considered an unacceptable translation as there are many kind of neuropathy. They may have found it difficult to graspthe meanin for the first element *demyelinating* as it cannot be found in dictionaries (see 5.2.1.1). Some gave مزيل الاعتلال العصبي ; they may have tried to literally translate the parts of the term *demyelinating* (*de and myelin*) depending on some dictionaries (see *Hitti's Medical Dictionary*) and produced the translation اعتلال عصابي لعدم وجود الميلانيين.The other 50% of the participants managed to produce accurate versions in Arabic for the term, which are:

مرض عصابي نتيجة قلة مادة الميلانيين حول العصب

مرض عصابي ينتج عن قلة غلاف الميلانيين حول العصب

Their translations reflect their ability to understand the meaning of the term in SL and then render it into Arabic.

Term 30 Anthrax

Although the term can be found in many English-Arabic dictionaries (see *The Unified Medical Dictionary* and *Hitti's Medical Dictionary*), 17% of the professional translators did not manage to give the appropriate answer. They transliterated the term as انثراكس, whereas the term has an Arabic equivalent (see 5.2.1.1). 83% of translators rendered the term correctly into Arabic as الجمرة الخبيثة .

Term 32 Orthoptic clinic

8% of the translators gave an unacceptable translation which was عيادة فحص النظر. It means optician. They may have confused the job of the *orthoptist* and the *optician* as both of them look after vision. 92% of translators gave accurate translations for the term such as عيادة تقويم البصر و, عيادة تعديل النظر (see 5.2.1.1)

Term 38 Videofluoroscopy

A high percentage of participants (33%) produced unacceptable translations such as:

منظار

جهاز تنظير

فيديوفلورسكوبي (which is a transliteration of the term)

The participants may not have differentiated between different kind of video-copies. Although the sentence contains the key meaning of the term (see 5.2.1.1), 33% of the translators did not manage to grasp the correct meaning of the term. 67% of the translators gave an accurate translation for the term. They managed to give an acceptable explanation of the term. The professional translators may either have depended on the context of the sentence or the term may be known to them so they produced correct translations such as: : منظار متابعة البلع and some gave an explanation which is جهاز فحص طريقة البلع.

Term 39 Fundoplication

A high percentage (33%) of the translators translated the term unacceptably. They gave some inappropriate answers such as فتح المعدة . عملية جراحية للمعدة و عملية جراحية للمريء. The reason for this result reflects the difficulty of finding an equivalent for the term in Arabic, as it cannot be found in English-Arabic dictionaries. Also, the translators may not have looked for the meaning in English to give an appropriate explanation in the TL (see 5.2.1.1). 67% of the translators managed to understand or looked for the meaning of the term in SL and produced acceptable explanations in the TL such as:

رجوع الطعام او الشراب الى المريء عملية جراحية للمعدة من جهة المريء لمنع ,

عملية تضييق المريء من جهة المعدة .

Term 40 Gastrostomy

Only 8% of the translators could not manage to give an acceptable meaning of the term in Arabic. They translated the term as المعدة .The translators may have consulted *Google translate* or they may know the term is related to the stomach, but they could not give an accurate meaning which is عملية فتح ثقب بالمعدة لسبب طبي (see 5.2.1). 92% of the translators gave acceptable explanations for the tern in TL such as:

عملة فتحة بالمعدة من اجل التغدية او حقن الدواء مباشرة في المعدة

للتغدية و المداوة عملية ثقب بالمعدة.

Term 41 Haemophilia B

33% of the translators transliterated the term into Arabic as هيموفيليا بي. It is regarded as an unacceptable translation as the term already has an equivalent in Arabic and the transliterated term هيموفيليا بي is not common in Arabic. 67% of the translators gave acceptable translations in Arabic. Some gave an equivalent in Arabic which is مرض الناعورة ب and some gave a correct explanation for the term in TL such as:

مرض في الدم بسبب نقص عامل التجلط فيؤدي الى صعوبة ايقاف النزيف اذا حصل

مرض وراثي يصيب الدم ينتج عن نقص عامل التتجلط الثامن .

The above explanations reflect the abilities of the translators to search for or understand the meaning of the term in the SL.

Term 44 African Trypanosomiasis

Only 8% of the translators transliterated the term as الثريبنوسوميزيا. The term has an equivalent in Arabic which is مرض النوم. A high percentage (92%) delivered a correct translation.

The answers to the open questions at the end of the questionnaire showed that 89% of the participants consulted medical dictionaries but only 4% used CAT tools to translate the medical term. 52% of the translators believe that the medical dictionaries and CAT tools they used were not helpful in translating some medical terms.

5.2.1.3 Comparison Between the Percentage Results of the Postgraduate Students and the Professional Translators.

Table 6 shows that a high percentage of 92% consisted of acceptable translations given by professional translators, which is very high compared with the postgraduate student's answers (58%). 8% were regarded as unacceptable translations, with a zero percentage of blank translations being given by professional translators. Referring to the answers of the first question on the questionnaire (see appendix 3) the researcher found that almost all of the unacceptable translations were given by translators who have less than five years of experience of working in the medical field. The results indicates the difficulties that face the inexperienced and untrained translators in translating medical terms, which is one of the hypotheses of this study. On the other hand, it shows the ability of experienced translators in dealing with translations of medical terms as almost all of the acceptable translations were given by experienced translators.

The table below shows a comparison between the percentage results of students' answers and professional translators' answers. When the unacceptable translations (by both samples) amount to more than 20%, these are highlighted in the tables. So the reader can recognize which terms represent difficulties for both samples.

Table 6: Comparison Between Postgraduate Students' (PG) Percentages Results and Professional Translators' (PT) Percentages Results.

N	Medical Terms	Acceptable translation %	Acceptable translation%	Unacceptable translation %	Unacceptable translation%	Blank %	Blank%
		By PT	By PG	By PT	By PG	By PT	By PG
1	Orthotic appointment	92	19	-	54	8	28
2	Outpatient appointment	100	61	-	33	-	6
3	Phlebotomy	75	22	**25**	**44**	-	31
4	Cholera	100	96	-	-	-	4
5	Meningococcal diseases	92	65	8	13	-	22
6	Tetraplegia	100	72	-	9	-	19
7	Hypermetropia	75	52	**25**	**28**	-	20
8	Astigmatism	83	45	17	37	-	20
9	Cystoplegia	100	39	-	19	-	43
10	Hospital-acquired infections	100	83	-	11	-	6
11	Malaria	100	91	-	6	-	4
12	HIV	100	69	-	24	-	7
13	Meningitis	100	85	-	6	-	9

14	Ebola	100	50	-	30	-	20
15	Nipah virus	92	65	8	7	-	28
16	Pediatric hematology department	92	63	8	17	-	20
17	Neurologists	100	20	-	67	-	13
18	Physiotherapy	100	85	-	7	-	7
19	Occupational therapy	92	57	8	30	-	13
20	Immunisation	100	63	-	31	-	6
21	Plague	100	94	-	-	-	6
22	AIDS	100	94	-	-	-	6
23	MRI	100	74	-	17	-	9
24	Thalassemia	67	50	33	15	-	35
25	Aspiration	58	13	**42**	**67**	-	20
26	Demyelinating neuropathy	50	7	**50**	**69**	-	24
27	Retinopathy	100	61	-	20	-	19
28	SARS	100	31	-	43	-	26
29	Smallpox	100	94	-	2	-	4
30	Anthrax	83	81	17	17	-	2
31	Catheter	100	78	-	2	-	20
32	Orthoptic Clinic	92	59	8	28	-	13
33	Paediatrician	100	83	-	13	-	4

34	Tuberculosis	100	78	-	-	-	22
35	Bovine spongiform encephalopathy	100	57	-	15	-	28
36	Flu jab	100	37	-	39	-	24
37	Neuropathy	100	76	-	4	-	20
38	Videofluoroscopy	67	2	**33**	**63**	-	35
39	Fundoplication	67	13	**33**	**39**	-	48
40	Gastrostomy	92	30	8	44	-	26
41	Haemophilia B	67	44	**33**	**22**	-	33
42	Immunology assessment	100	81	-	2	-	17
43	Ophthalmologist	100	72	-	-	-	28
44	African trypanosomiasis	92	41	8	6	-	54
45	Haemoglobinopathies	100	74	-	7	-	19
	Total	4125	2628	364	1004	8	900
	Total Mean %	92	58	8	22	0	20

The above table shows how the professional translators succeeded in dealing with most medical terms. It also shows that the professional translators and postgraduate students share problems of translating some medical terms. They both gave more than 20% of unacceptable answers to the following terms:

term 3 *Phlebotomy*

term 7 *Hypermetropia*

term 25 *Aspiration*

term 26 *Demyelinating neuropathy*

term 38 Videofluoroscopy

term 39 *Fundoplication*

term 41 *Haemophilia B*

The reasons for the problems of translating the above terms can be grasped from the discussion of the answers of both samples. From the analysis it can be found that term 3, term 26, term 38 and term 39 cannot be found in English-Arabic medical dictionaries. Term 25 has more than one meaning in English (polysemy). Term 7 was literally translated by both samples. Term 41 was transliterated by professional translators and most postgraduate students.

5.3 Part Two: Strategies Employed in the Translation of Medical Terms in this Study.

5. 3. 1 The Strategies Employed by Postgraduate Students (Sample One) in the Translating of Medical Terms

An open question was included at the end of the questionnaire to be answered by the postgraduate students. Unfortunately, the researcher did not receive enough answers in this section from the students, as only nine participants gave answers to the question and three of them were not clear. The question was about the strategies that the subjects had used in their translations of the forty-five terms. After analysis of the data, the researcher herself managed to find out some of the strategies that had been adopted by the postgraduate students.

The participants used different strategies to translate medical terms. The following lists a number of strategies which were identified.

1. Translation: it is used when each English term has an equivalent term in Arabic. Usually Englsih-Arabic dictionaries and CAT tools are helpful in this case, e.g:

(1a) plague الطاعون

(1 b) smallpox الجدري

(1 c) tuberculosis السل او الدرن

Some terms, elements of the compound or affixes were literally translated, using word for word translation. This strategy was used in translating many terms in the group, e.g:

(1 d) Outpatient appointment موعد مريض خارجي

(1 e) Immunology assessment تقييم علم المناعة

(1 f) Pediatric Hematology Department قسم علم دراسة دم الاطفال

2. *Transliteration:* which means the transliteration of an English term that has an already existing equivalent in Arabic which is more transparent than its proposed transliterated form. In other words, transliteration can be explained as the English word written in Arabic script, e.g:

(2 a) Haemophilia B هيموفيليا بي hīmūfīlyā bi

(2 b) astigmatism استيقماتيزم āstīqmātīzim

(2 c) MRI ام ار اي im ār āi

3. Arabization: this strategy involved adapting an English word and reforming it to suit Arabic pronunciation and grammar, *e*.g:

(3 a) Anthrax الانثراكس al-ānthrāks

(3 b) SARS السارس al-sārs

4. *Explanation:* this strategy was used in translating some terms. It involves giving an explanation of the term instead of providing the TL equivalent, e.g:

(4 a) Bovine sponge encephalopathy مرض ينتج عنه خلايا المخ تصبح كالاسفنج

(4 b) Gastrostomy استئصال جزاء من المعدة

(4 c) Demyelinating neuropathy اعتلال عصبي لعدم وجود النخاعين

5. *Omission*: this strategy was used with some terms that consisted of more than one part and with compounds. It means leaving out one or more of the elements of the SL compound without including them in the translation, e.g:

(5 a) Videofluoroscopy منظار

(5 b) Flu jab لقاح

(5 c) Gastrostomy المعدة

6. *Translation by a more general word* (superordinate): this strategy could be used when the subjects understood only the core element of the term and rendered it into Arabic and ignoring the other element of the word, abbreviations or compounds, e.g:

(6 a) Haemoglobinopathies امراض بالدم

(6 b) Haemophilia B نزيف

(6 c) Ophthalmologist طبيب عيون

7. *Focusing on translating the term as a single unit and ignoring the sequence of the context*, e.g:

(7 a) Ebola فيروس ايبولا

(7 b) Videofluoroscopy فيديو التنظير

(7 c) Immunology assessment تقييم علم المناعة

8. Translating the term according to the meaning of prefixes, roots and suffixes that the term is built of, e.g:

(8 a) Tetraplegia شلل رباعي

(8 b) Haemoglobinopathies اختلالات في الهيموجلوجبين

(8 c) Neurologists اخصائي طب اعصاب

From the given examples that have been taken from the data discussions above, it can be noticed that some subjects succeeded in obtaining the correct translation by using the above strategies and some failed as the above strategies may work in the translation of some terms but do not give accurate translations in other cases.

5. 3. 2. **The Strategies Employed by Professional Translators (Sample Two) in the Translating of Medical Terms**

The professional translators answered the questions (about the strategies they used in translating each term), after the questionnaire had been adjusted by the researcher (see 4.6) . The adjustment of the questionnaire helped the researcher to identify the strategies used by the professional translators for translating each term. The answers of the professional translators will be presented below in Table 6 and discussed.

Table 7: Percentage Results of the Strategies used by Professional Translators in Translating Medical Terms

N	Medical Terms	Translation%	Arabization%	transliteration%	explanation%	others%
1	Orthotic appointment	8			92	
2	Outpatient appointment				100	
3	Phlebotomy	25			75	
4	Cholera	30		70		
5	Meningococcal diseases	100				
6	Tetraplegia	100				
7	Hypermetropia	75				25
8	Astigmatism	83		17		
9	Cystoplegia	100				
10	Hospital-acquired infections				100	
11	Malaria	5		95		
12	HIV				100	

13	Meningitis	100				
14	Ebola	10			90	
15	Nipah virus			92		8
16	Pediatric hematology department	8			92	
17	Neurologists	100				
18	Physiotherapy	100				
19	Occupational therapy	92				8
20	Immunisation	100				
21	Plague	100				
22	AIDS	86		14		
23	MRI	100				
24	Thalassemia	42		25		33
25	Aspiration	42			58	
26	Demyelinating neuropathy				50	50
27	Retinopathy	100				

28	SARS				100	
29	Smallpox	100				
30	Anthrax	83		17		
31	Catheter	100				
32	Orthoptic Clinic				100	
33	Paediatrician	100				
34	Tuberculosis	100				
35	Bovine spongiform encephalopathy	100				
36	Flu jab				100	
37	Neuropathy	100				
38	Videofluoroscopy	13			67	20
39	Fundoplication				100	
40	Gastrostomy	8			92	
41	Haemophilia B	55		33	12	
42	Immunology assessment				100	
43	Ophthalmologist	100				

44	African trypanosomiasis	92		8		
45	Haemoglobinopathies	85			15	
	Total	2542		371	1380	144
	Total mean %	57		8	31	3

The above table shows that the professional translators used different strategies to resolve the difficulties of translating medical terms. The following lists a number of strategies which were identified.

1. *Translation*, e.g:

Catheter القسطرة

Meningitis التهاب السحايا

Paediatrician طبيب اطفال

57% of the acceptable translation were rendered into Arabic by using this strategy.

- *Transliteration*, e.g:

Nipah virus فايروس نيباها

AIDS ايدز

Cholera كوليرا

The table shows that 8% of the acceptable translation were transliterated into Arabic.

3. Explanation: The professional translators adopted? this strategy because the terms do not have equivalents in Arabic e.g:

Hospital-acquired infections العدوى المكتسبة من المستشفيات

Fundoplication عملية تضييق بوابة المعدة عند اسفل المريء حتى لا يحدث الارتجاع

Gastrostomy عملية فتح ثقب بالمعدة لغرض التغذية و حقن الدواء

Explanations were used to translate 31% of the terms. The table shows that 18 out of 45 medical terms were rendered into Arabic by explanations. 9 of them are collocations and compounds.

4. Others: the professional translators used other different strategies to translate medical terms. These strategies were:

- Translate the term by using general meaning in Arabic. e.g:

Demyelinating neuropathy *مرض عصابي*

Nipah virus فايروس

- Translating the term according to its affixes. e.g:

Hypermetropia مد البصر

From the data analysis, it can be seen that there are some terminological inconsistencies in translating some medical terms into Arabic, e.g:

Malaria ملاريا , البرداء

Hypermetropia بعد نظر , طول نظر

Thalassaemia تلاسيميا , فاقة البحر الابيض المتوسط

Tuberculosis السل , الدرن

Cholera كوليرا , الهيضه

Chapter Six : Conclusions and Recommendations

Chapter Six : Conclusions and Recommendations

6.1 Introduction and summary of the study

This thesis has shed light on a vital and specific field of translation which is medical translation with special emphasis on the translation of medical terms. The study investigated the problems of translating medical terms such as the names of diseases, conditions, symptoms, viruses, tests, as well as medical equipment, from English into Arabic. The study focused on the nature of potential challenges that the translation of medical terms presents for translators. The study explored theoretically the notion of medical terms and how they work in both English and Arabic and also reviewed equivalence in medical terminology. As medical translation is related to technical translation, an overview of technical translation in general was first undertaken. It has been argued that the transfer of knowledge of modern science and technology is needed to cope with the constant growth and development of technology in the world. Thus, the technical translator plays an important role in this process of transferring and communicating through translating new technology, scientific discoveries and updated medical information from and into different languages around the world, so that all nations can access the new technology. It has also been useful to include an overview of the efforts made by some institutions and Arabic academies in the Arab countries on the issue of arabization, translation and standardization in this study.

Most of the theoretical parts of the study were found to be of equal importance to the practical part, because they furnished the grounds for the empirical aspects of the study and illustrated some difficulties, information, and ideas by some Arab scholars on the problem of STT in general and medical translation specifically. The practical part of the study emphasised the difficulties and problems faced by Arabic translators in the translation of medical terms and how professional experienced translators deal with these problems. To find out the reality of these problems and how they affect their work as translators in the

medical field, the study empirically investigated the translation of a representative set of medical terms. This was achieved by devising a questionnaire containing forty-five items representing medical terms to be answered by research students doing PhDs in Arabic translation, and secondly professional translators working in the medical field.

After discussion of the analysis, it was possible to classify the type of strategies that the participants employed to translate such terms. Eight strategies were identified and exemplified which are:

1.Literal translation

2.Transliteration

3.Arabization

4.Explanation

5.Omission

6.Translation by a more general word (superordinate)

7.Focusing on translating the term as a single unit.

8.Some participants divided the terms into elements such as suffixes, prefixes and roots to grasp the whole meaning of the term.

It should be mentioned that there are instances in which no one-to-one correspondence between the ST and the TT is possible. This is the case of zero equivalence (non-equivalence) which can occur in technical and scientific translation in general and in the medical field specifically. For example, to date, there are no Arabic equivalents for terms such as *gastrostomy, demyelinating neuropathy and fundoplication.*

In the context of this study, it has been noted that, since most Arab doctors use English in writing medical texts or reports (especially those who work in Mashriq countries), it is necessary for Arabic translators to be the effective link between doctors and patients and medical text readers. Hence, it becomes crucial that translators should have some knowledge of the subject matter of the medical text.

The significance of English as the main language of research and the need for translation from English into Arabic is of concern in Arab countries as medical English is the language of training and study in most Arab medical schools. Al-Buzaidi (1995) emphasises that the need for medical translation from English to Arabic can be ascribed to the fact that English has been the language of training and study in most of the medical schools in Arab countries. Science, education and any training that involves the acquisition of modern technology is essentially taught and learned through the medium of English. Hence, there has been an increasing interest in investigating the problems of using English and in translating English medical terms. Furthermore, it should also be noted that in most Arab countries science and the acquisition of modern technology is essentially taught and learned in English more than in any other language.

6.2 Conclusions and findings of the study

The findings of this study show that the translation of medical terms proved to be problematic for inexperienced translators and postgraduate translation students. In addition, the findings indicate that inexperienced translators and postgraduate students have a clear and obvious weakness in finding accurate translations and appropriate explanations for the terms that either cannot be found in English-Arabic medical dictionaries and CAT tools or have no equivalents in Arabic. The study also found that most of the unacceptable translations were given by postgraduate translation students and professional translators who have less than five years of experience in the medical field. This could be negatively reflected

in their work as translators in a sensitive field such as medicine. Moreover, the results of the study alert us to the fact that employing inexperienced translators and bilinguals (who speak English and other language) without providing training for them may constitute a risk for the communications between patients and health sectors. In other words, translators who are interested to work in the medical field need to be trained better before they start their job.

Judging the errors which the students and inexperienced professional translators made in translating medical terms, the study has suggested the following remarks which indicate the problematic nature of the translation of medical terms into Arabic. They are illustrated with some examples taken from the subjects' answers in the main test.

1. The use of literal translation in the translation of terms into Arabic has shown that there are a significant number of terms which were rendered literally but failed to translate well into Arabic. Literal translation sometimes works and gives a correct translation and sometime it does not. It can be effective with some medical terms. It was noted that the respondents used literal translation to render complex and non-equivalence terms, e.g:

The compound *Bovine spongiform encephalopathy* was literally translated by some postgraduate translation students? as اعتلال دماغي بقري اسفنجي الشكل and was regarded as an unacceptable translation (see 5.2.1.1 Term 35), whereas the literal translation of *hospital-acquired infections* اكتساب العدوى من المستشفيات which was given by 83% of postgraduate translation students and 100% of professional translators was considered as an acceptable translation.

2. There was extensive use of transliteration and arabization by the participants of the study in order to transfer the SL meaning to the TL. That happened in the translation of a sizeable number of terms. Some participants in the study samples resorted to

transliteration to overcome problems of non-equivalence and neologisms. Many of the participants also used this method of translation when they rendered terms that cannot be found in English-Arabic medical dictionaries and CAT tools. It was also realised that it was easy to use transliteration and arabization as they are merely the transference of Latin letters into Arabic letters. Transliteration can indeed be effective in rendering some terms that include names, such as names of inventors or places, e.g. *Ebola* حمى ايبولا, *Nipah virus* فايروس نيباه .Also, some Arabic terms are transliterated from English and commonly used in Arabic such as *malaria* ملاريا , *cholera* كوليرا and *AIDS* ايدز.

3. The participants often faced difficulties in working out the semantic relationship between elements of medical compounds. This was due to the fact that some of the study samples lacked experience in dealing with medical compounds in translation which affected their choice of the accurate meaning of the compound in Arabic. Compounds in the medical field present a real problem in translation as they cannot be found in bilingual dictionaries and CAT tools, e.g: *Pediatric Hematology Department* قسم علم دراسة دم الاطفال (see 5.2.1.1 Term 16)

4. Lack of knowledge of medical terminology: many medical terms are complex and contain more than one affix. Knowing the meaning of affixes would help in grasping the meaning of the term. For instance, if the translator knows that the suffix *itis* means inflammation he/she will never translate *meningitis* as a name of a virus. Montalt and Gonzalez (2007: 232) argue that "*a knowledge of the Greek and Latin roots, prefixes and suffixes can provide the basic building blocks of medical terminology and can enable one to infer the meaning of the whole", e*.g: *Meningococcal diseases* امراض سحائية , *Meningitis* التهاب السحايا

But, in some terms, even knowing the meaning of the suffixes and prefixes will not give the accurate meaning, e.g:

Outpatient appointment موعد مريض خارجي which is unacceptable translation.

Smallpox الجدري the prefix *small* is not included in the Arabic equivalent.

5. The problems of polysemy: some participants from the study samples could not choose the appropriate Arabic equivalent for a term that has more than one meaning in Arabic. This occurred because the study samples lacked relevant knowledge in the medical field which, in turn, affected their choice of the correct equivalent. For example, *labour* in medical texts pertains to delivering a baby and means giving birth to a child and not to the word 'work'. Thus the translator should have knowledge about the subject field to which the text is related. For example:

Aspiration طموح

Flu jab بالكوع ضربة

Both answers were wrong choices and were given by some participants in the study (see 5.2.1.1 Term 25 and Term 36).

6. Some participants from the study samples failed to recognize the textual level in the course of translation. Hence, a number of the participants dealt with a term at the word level without paying attention to the context which led to an undermining of the cohesion and coherence of the text. Thus, translators should be aware that terms play an important role in the context of a sentence. It is important for a translator to read the sentence carefully before commencing the process of translation. Montalt and Gonzalez (2007: 247) state: "*As is normally the case in any type of translation,*

context is what most reliably guides the translator to the choice of the most appropriate meaning activated in the source text."

The context of the term within the sentence provides a good clue to produce an accurate meaning for a term, as each single word or item in the sentence is related and linked to the other items that build up the context, e.g.:

Neurologists علم الاعصاب

The above answer was unacceptable but was given by some participants. The acceptable answer can be grasped from the context. An acceptable translation could be:

أخصائي او طبيب امراض عصابيه

This is the sentence where the term appeared:

*"Health professionals including **neurologists**, and physiotherapy, occupational therapy and speech therapy were involved."*

Another example:

Videofluoroscopy فيديو التنظير

The above interpretation was given in the official translation and was regarded as an unacceptable answer. Although the meaning can be grasped from the context, only one postgraduate translation student and 67% of professional translators managed to provide an acceptable translation of the term.

The following sentence contains the above term:

*"The patient had a **videofluoroscopy** examination to further assess her feeding and swallowing skills."*

The underlined words could be the clue.

(see data analysis Term 38 Videofluoroscopy)

7. Some participants in the study samples tended to use general words (superordinates) to render the meaning of the term into the target language on occasions when the target language already had a specific equivalent for it. Using a superordinate can be effective in translating some terms but it does not work with others, e.g:

(7a) Haemophilia B نزيف , which means bleeding

(7b) Astigmatism مرض بالعيون , means a defect affects the eyes

(7c) Thalassaemia مرض بالدم , literally means a disorder in the blood.

All were unacceptable choices as in 7a there are many kind of bleeding but haemophilia B is a particular kind of serious bleeding condition. The same point can also be made with reference to 7b and 7c. In these cases the translation has to be very specific.

8. A lack of awareness of the meaning of the term in the SL affects the translation of the term into the TL. Some participants in the study samples seemed to have no knowledge about the subject matter which, in turn, led to mistranslation in the TL, e.g:

(8.a) Demyelinating neuropathy اعتلال عصبي بسبب عدم وجود النخاعين

(8.b) Flu jab عدوى الانفلونزا

(8.c) Fundoplication جراحة المعدة

The above are samples of serious mistakes made by postgraduates students and professional translators who have less than five years of experience, who are also regarded as inexperienced according to British Standard (BSEN 15038: 2006).

The results of this research corroborate the hypotheses and answer the questions stated in chapter one (1.4) in which translators were expected to face some difficulties in translating some medical terms. As mentioned earlier, the results show that some difficulties were due to 1. translators' lack of experience and training to be ready to work in medical field, 2. some medical terms such as compounds, collocations and abbreviations cannot be found in either English-Arabic dictionaries or monolingual dictionaries. They also show that the participants employed different strategies in their translation of medical terms (as discussed in chapter 5). Therefore, I hope that the results of this research will be taken into consideration as a step forward towards improving the translators' level and competence by providing them with special training in medical translation as well as in developing the translation programme in Arab countries and at UK universities to include some courses in medical translation. In this regard Baker states (2011:1),

> *"There are two main types of training that a profession can be provide for its members: vocational and academic training. Vocational courses provide for its members: vocational courses provide training in practical skills but do not include a strong theoretical component ... Like vocational courses, most academic courses set out to teach students how to do a particular job... an academic course always includes a strong theoretical component".*

Such practical and academic trainings would give translation students and novice translators the chance to be more competent in their translation careers.

From the study, terminology inconsistency, which means that one English term has different translations in Arabic, has been detected in several medical terms used in the study. This inconsistency is attributed to the lack of term standardization as a result of different Arabic

academies and bodies of translations in the Arab world; each works individually and follows different procedures and nomenclature to codify a/the medical dictionary.

It should be noted that the professional translators may not be aware that using CAT tools could be helpful for them.

6.3 Remedial Solutions

Based on the findings and results of the study, some remedial solutions are suggested as a mean of avoiding such errors in future and to tackle the problems of non-equivalence. First, the researcher finds it useful to start with general guidelines for translating medical terms. These guidelines are not direct findings from the study.

6.3.1 General Guidelines for Translating Medical Terms

The following are some general recommended steps:

Read the text, where the medical terms appear, and carefully underline the medical term. Check the terms in English-Arabic medical dictionaries (printed and online) and use different CAT tools (see Chapter 3). Using medical dictionaries and other resources to find the definition of a term is an important part of mastering the correct use of medical terms. Medical translation is a sensitive area and a translator should make sure that he/she chooses an accurate equivalent for the English term in Arabic. Consulting medical dictionaries and CAT tools are helpful in some cases. Checking the spelling is very important. Terms with similar spellings can have very different meanings as in the case of translating the terms *orthotic* and *orthoptic;* these two words have similar spellings but have completely different meanings as the first refers to bones and the second refers to the eyes.

If the term includes more than one word, begin the search with the last term. If one does not find it there, move forward to the next word. For example, congestive heart failure is sometimes listed under ‘heart failure, congestive’.

6.3.2 Suggested Solutions to Deal with Ambiguous and Non-Equivalent terms

Where there is no equivalent term for the term or the term is new, the translator could search on major and reliable medical websites (see 3.4) or consult a specialist, if possible, to obtain the meaning in English then transfer the meaning into the TL as an explanation or definition.

The internet is a valuable resource in finding definitions, information and details concerning medical conditions and terms. However, it is important that translators validate their terms only on reliable sites, such as the National Institute of Health (NIH) websit[46]e which is known to be a reputable information source. Also the National Health Service (NHS) website is a very useful resource and the WHO website is a rich resource in the medical field. For the best results, an internet search should include visits to several medical sites that include information about the term . If there is a major difference in the definitions and information on the sites, ask for advice from consultants if possible. Bowker (2002: 215) suggests:

"it would be more helpful for translators to have access not simply to term records that provide a single 'best' term with a solitary context, but rather to information that would allow them to see all possible terms in a range of contexts and thus find the solution that works best in the target text at hand".

It is important for a translator to have an idea about the meaning of affixes that are used with medical terms. For example, if a translator knows that the suffix *itis* means inflammation, he/she would not describe the term *myofibroitis* as a part of the body.

Moreover, it is worthwhile to think of how to rephrase a text and to demonstrate how respondents can improve their verbal performance, and to encourage them to reflect on what they think they have learned and how they could do better, to connect with what they do in the SL and to what they produce in the TL. All this could lead researchers to find ways of enhancing the quality of translation.

When using English- Arabic dictionaries and CAT tools, the translator should be aware that:

[46] See www.nih.gov

- Not all meanings that are given in some Arabic medical dictionaries and CAT tools may be acceptable. So consulting a English-English medical dictionary is needed to check the meaning in English. For example, the equivalent of the term *flu jab* (see data analysis Term 36) which is given by *Google Translation* is incorrect. The translator may also need to check the term on major and reliable medical websites, such as *NHS's* websites, WHO's websites and NIH's websites. For a more accurate translation, check more than one medical dictionary.

- In some cases, giving the meaning of the term that one has found in an English–Arabic dictionary may not be helpful and can lead to a wrong translation as the context of the sentence is important and may change the meaning of the term. For example, the equivalents of the term aspiration (see data analysis Term 25), which are given in *Hitti's Medical Dictionary* and *The Unified Medical Dictionary* do not give the correct meaning of the intended term.

- The terms that cannot be found in English-Arabic dictionaries and CAT tools should be checked in a monolingual medical dictionary to obtain the meaning and to use the explanation to transfer the meaning into Arabic. Dictionaries should be regarded as a useful and helpful source for translators. However, most of them lack recent updates. Uvarov (1988:91) states that "*no printed dictionary of any developing scientific or technical subject can possibly be either up to date or complete; the speed with which new scientific terms and techniques appear greatly exceeds the speed of compilation and publication*." Some medical terms such as compounds and abbreviations cannot be found in dictionaries. In this situation, the translator should search reliable medical websites (see chapter three 3.4), which can offer useful information. Montalt and Gonzalez (2007:220) describe the internet as a "*vast store of*

readily-accessible knowledge which has radically changed the way translators work and has made the job of technical and scientific translation much easier". The internet may also assist with the problem of new terms and non-equivalence. In this situation the translator can adopt the English term followed by a correct explanation of the term (See Chapter 3). But, in this situation, the researcher insists that the translator should have a good knowledge of the medical field and of medical terminology in both languages.

- If the term has more than one meaning (polysemy), a translator should rely on the context and choose the correct equivalent. The sentence where the term appears can provide good clues for obtaining the meaning of the term and then transferring the meaning into the TL. In this situation, the translator should have knowledge of the subject matter. A translator should understand the meaning of a term in the SL which then will make it easier for him/her to choose the appropriate equivalent term and explanation in the TL.

6.4 Contribution of the Study

This study is an attempt to fill a gap in a neglected area that has had little research attention in the Arab world in general, and in Libya specifically.

The current study has suggested that, despite the availability of English-Arabic medical dictionaries and CAT tools, many medical terms are not found within such reference material. This is because medical terminology is not static and it always has new terms which may not have direct equivalents in Arabic. Also, compounds and abbreviations cannot be found in English-Arabic medical dictionaries and CAT tools. The study found that few participants consulted CAT tools, which indicates that translators may not be trained to benefit from such sources.

This thesis, to the best of my knowledge, is the first to include professional translators who work in the medical field as one of the sample used in the study. Their feedback was useful to this study and alerted the importance of vocational and academic training for translators who are interested in working in the medical field.

The study also included some recommendations for translation offices to bear in mind before employing novice translators in health sectors.

6.5 Implications and Recommendations

Translators of medical texts are required to have a good command of both the SL and the TL, a good knowledge of the subject matter, an up-to-date knowledge of their specialised field and a broad understanding of medical terms and abbreviations. As the translator of medical texts deals with a subject related to human life , he/she should be careful in choosing the exact and accurate Arabic equivalent for each English medical term. Moreover, it is essential for a translator to look for the medical lexis in an English-Arabic medical dictionary and consult CAT tools.

After the analysis of their errors, it can be claimed that the participants lack knowledge of the subject matter and of medical terminology which, therefore, leads to the mistranslation of some terms. Also, it can be seen that a problem emerged in relation to non-equivalents, compounds, abbreviations and new terms, as the translators seemed to struggle to find these terms in English-Arabic medical dictionaries. Regularly updated English-Arabic medical dictionaries would be useful and translation quality would be much better.

It might be a worthy suggestion for Arabic academies to exert some efforts to produce an English-Arabic medical dictionary or to adopt *the Unified English-Arabic Medical Dictionary* (which is produced by the WHO) as a credible source of reference and to avoid terminology inconsistency after having carried out a comprehensive review of its entries by medical consultants. With the help of new and available technology, Arabic academies could consult

Arabic experts, terminologists and medical specialists to agree to create an on-line English-Arabic medical dictionary where they can include every up-to-date medical term including abbreviations and medical compounds.

Based on the findings from the study, a number of recommendations can be put forward as follows:

1. Teachers involved in postgraduate translation programmes at universities are recommended to include medical translation as an optional subject for the students who are interested in working in the medical field. Such a programme would assist them in undertaking medical translation work properly.

2. Instructors are recommended to involve translators who are interested in working in the medical field in intensive courses to prepare them to work in the medical field. As the data analysis shows, some respondents failed to give correct explanations for some terms that have no equivalent terms in Arabic.

3. Instructors are also recommended to engage students who are interested in working in the medical field in training in medical terminology. This training would enable students to learn about medical terms and how they work. As has been shown in Chapter 3, most medical terms contain affixes. Knowing the meaning of these affixes would be very helpful for translators and it would enable them to choose the correct meaning for the term in question.

4. Translation offices should provide their employees who are interested in working in the medical field with vocational and academic training in medical translation before starting their jobs in health sectors.

5. Translation offices should provide their members with training in how they could benefit from electronic sources and CAT tools.

6. Arab expert translators and linguists could set up a special committee. This committee could meet regularly to discuss and create an Arabic equivalent for each new medical term. The committee could create their own website which could be accessible to Arabic translators.

7. Medical specialists and Arab expert translators could produce an English-Arabic dictionary which includes medical compounds and abbreviations which would be a useful reference for Arabic translators. The discussion of the data analysis shows that the population of the study struggled to translate some abbreviations and compounds as it was likely that they could not find them in medical dictionaries, and CAT tools were not helpful .

6.6 Suggestions for Further Research

This study has shed light on the translation of medical terms as a problem that causes real translation challenges. The study focuses on the translation of medical terms in general. Therefore, the researcher suggests some recommendations for future research on medical translation.

1. As this study only attempted to cover the problem of translating medical terms in general, further research is needed to focus on the problem of translating medical compounds and abbreviations in particular.

2. This study talked about neologisms and the problem of non-equivalence as one of the challenges of translation. A deeper study is needed to investigate these problems in particular.

3. Further comparative research is needed to show the importance of experience and training for translators to work in the medical field. The study could involve more numbers of inexperienced and experienced professional translators who work in the medical field.

4. Further study is needed to investigate medical terminology, in Arabic and English, and how it works. It is hoped that this study will provide a good resource for Arabic translators who work in the medical field.

5. This study presents some information on terminology inconsistency in Arabic medical terms. A deeper study on terminology inconsistency and standardization would be useful.

Conducting studies in the above-proposed areas of research would contribute to tackling a major translation problem, that is the translation of medical terms, and this would contribute to the development of English-Arabic medical translation in general.

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Appendix 1: A Pilot Study

A Pilot Study

Please, only translate the highlighted items in the following sentences into Arabic

1. All you need to know about the new **HPV vaccine** that protects against the commonest cause of cervical cancer.

2. Cholera, **yellow fever** and epidemic meningococcal diseases made a comeback in the last quarter of the 20th century.

3. Drug resistance is also evident in **diarrhoeal diseases**, hospital-acquired infections, and is emerging in HIV.

4. Emerging viral disease such as Ebola, **Marburg haemorrhagic fever** and Nipah virus pose threats to global public health security.

5. Health professionals including neurology, physiotherapy, occupational therapy and **speech therapy.**

6. PH study showed **severe oesophageal reflux.**

7. Smoking tobacco is a cause of many diseases, including respiratory (breathing) e.g. **emphysema**.

8. The emergence of new foodborne diseases creates considerable concern, such as the recognition of the new variant of **Creutzfeldt-Jakob disease** associated with bovine spongiform encephalopathy.

9. The patient has hypermeropia and **nyatagmatism.**

10. The result was that within the next 20 years, many important vector-borne diseases including African trypanosomiasis, **dengue** and dengue haemorrhagic fever, and malaria emerged in new areas or re-emerged in areas previously affected.

Appendix 2: The Questionnaire (The Main Study Test)

For Postgraduate Students

A Questionnaire:

This study tackles the translation of medical terms. Each phrase and sentence contains one medical term to be translated (in Bold). The context will help you determine the meaning of the term. You are kindly asked to translate into Arabic the highlighted term in every sentence and phrase and answer the questions at the end of the questionnaire. The information and answers that you provide will be used only for the purpose of scientific research and will be dealt with confidentially. The researcher highly appreciates your time and co-operation.

Where do you study? In England In Libya

1. An **orthotic appointment** has been made for the patient.

2. An **outpatient appointment** has been arranged for the patient.

3. Children requiring **Phlebotomy** need to have an appointment booked for blood tests.

4. **Cholera** continues to be a major health risk all over the world.

5. Cholera, yellow fever and epidemic **meningococcal diseases** made a comeback in the last quarter of the 20th century.

6. Diagnosis: complete **tetraplegia**

7. Diagnosis: **Hypermetropia** with astigmatism.

8. Diagnosis: Hypermetropia with **astigmatism**

9. Diagnosis: Neurogenic **cystoplegia** with spasm and urinary tract infection.

10. Drug resistance is also evident in diarrhoeal diseases, **hospital-acquired infections**, malaria, meningitis, respiratory tract infections, and sexually transmitted infections, and is emerging in HIV.

11. Drug resistance is also evident in diarrhoeal diseases, hospital-acquired infections, **malaria**, meningitis, respiratory tract infections, and sexually transmitted infections, and is emerging in HIV.

12. Drug resistance is also evident in diarrhoeal diseases, hospital-acquired infections, malaria, meningitis, respiratory tract infections, and sexually transmitted infections, and is emerging in **HIV**.

13. Drug resistance is also evident in diarrhoeal diseases, hospital-acquired infections, malaria, **meningitis**, respiratory tract infections, and sexually transmitted infections, and is emerging in HIV.

14. Emerging viral diseases such as **Ebola**, Marburg haemorrhagic fever and Nipah virus pose threats to global public health security.

15. Emerging viral diseases such as Ebola, Marburg haemorrhagic fever and **Nipah virus** pose threats to global public health security.

16. He is on regular follow up in the **Pediatric Hematology Department**

17. Health professionals including **neurologists**, and physiotherapy, occupational therapy and speech therapy were involved.

18. Health professionals including neurologists , and **physiotherapy**, occupational therapy and speech therapy were involved.

19. Health professionals including neurology, and physiotherapy, **occupational therapy** and speech therapy were involved.

20. **Immunisation**- the safest way to protect your health.

21. In recent years, the most serious outbreak of **plague** occurred in five states in India in 1994.

22. It would be extremely naive and complacent to assume that there will not be another disease like **AIDS**.

23. Japan and the United States have 5–8 times more magnetic resonance imaging **(MRI)** units per million inhabitants than Canada and the Netherlands.

24. Manchester Sickle Cell and **Thalassaemia** Centre

25. Problem: Concerns regarding **aspiration**

26. Problem: **Demyelinating neuropathy**

27. **Retinopathy** Screening Service

28. **SARS** and avian influenza in humans have triggered major international concern.

29. **Smallpox** is one of the oldest known human diseases.

30. The **anthrax** attack had huge economic, public health and security consequences.

31. The **catheter** should stay clamped except during voiding and must be changed every four weeks.

32. The child last attended the **Orthoptic Clinic** on 7th Dec 2009.

33. The child to see a consultant **paediatrician.**

34. The current situation is a wake-up call to all countries especially those in Arica, to ensure that basic **tuberculosis** control reaches international standards.

35. The emergence of new foodborne diseases creates considerable concern, such as the recognition of the new variant of Creutzfeldt-Jakob diseases associated with **bovine spongiform encephalopathy.**

36. The **flu jab** is free and available between September and early November.

37. The patient has a **neuropathy**.

38. The patient had a **videofluoroscopy** examination to further assess her feeding and swallowing skills.

39. The patient has recently undergone surgery for a gastrostomy and **fundoplication** at the General Hospital.

40. The patient has recently undergone surgery for a **gastrostomy** and fundoplication at the General Hospital.

41. The patient is a known case of **haemophilia B**.

42. The patient is waiting for **immunology assessment**.

43. The patient was referred to the consultant paediatric **ophthalmologist** at the eye hospital.

44. The result was that within the next 20 years, many important vector- borne diseases including **African trypanosomiasis**, dengue and dengue haemorrhagic fever, and malaria emerged in new areas or re-emerged in areas previously affected.

45. This person has been tested for the major **haemoglobinopathies**.

- Did you use English- Arabic medical dictionary to translate the above medical terms? Yes No

- If yes, was it useful? Yes No

- Can you tell me about the strategies that you use to deal with the problem of new terms and the problem of non-equivalence?

Appendix 2A : The Questionnaire (The Main Study Test)

For Professional translators

A Questionnaire A:

This study tackles the translation of medical terms. Each phrase and sentence contains one medical term to be translated (in Bold). The context of the term within the sentence will help you determine the meaning of the term. You are kindly asked to translate into Arabic the highlighted term (only) in every sentence and phrase and answer the questions at the beginning and the end of the questionnaire. Please note that the researcher meant by *translation strategy* that 'when English word get an Arabic equivalent'. The information and answers that you provide will be used only for the purpose of scientific research and will be dealt with confidentially. The researcher highly appreciates your time and co-operation.

How long have you been working as a translator in medical field?

Less than five years( ) Five years or more( )

1. An **orthotic appointment** has been made for the patient.

What kind of strategy have you employed in translating the above term?

1. Translation ( ) 2. Transliteration ( ) 3. Arabization ( ) 4. others ( )

If you have chosen *others*, could you please tell me what were they?

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2. An **outpatient appointment** has been arranged for the patient.

What kind of strategy have you employed in translating the above term?

1. Translation ( ) 2. Transliteration ( ) 3. Arabization ( ) 4. others ( )

If you have chosen *others*, could you please tell me what were they?

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3. Children requiring **Phlebotomy** need to have an appointment booked for blood tests.

What kind of strategy have you employed in translating the above term?

1. Translation ( ) 2. Transliteration ( ) 3. Arabization ( ) 4. others ( )

If you have chosen *others*, could you please tell me what were they?

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4. **Cholera** continues to be a major health risk all over the world.

What kind of strategy have you employed in translating the above term?

1. Translation ( ) 2. Transliteration ( ) 3. Arabization ( ) 4. others ( )

If you have chosen *others*, could you please tell me what were they?

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5. Cholera, yellow fever and epidemic **meningococcal diseases** made a comeback in the last quarter of the 20th century.

What kind of strategy have you employed in translating the above term?

1. Translation ( ) 2. Transliteration ( ) 3. Arabization ( ) 4. others ( )

If you have chosen *others*, could you please tell me what were they?

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6. Diagnosis: complete **tetraplegia**

What kind of strategy have you employed in translating the above term?

1. Translation ( ) 2. Transliteration ( ) 3. Arabization ( ) 4. others ( )

If you have chosen *others*, could you please tell me what were they?

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7. Diagnosis: **Hypermetropia** with astigmatism.

What kind of strategy have you employed in translating the above term?

1. Translation ( ) 2. Transliteration ( ) 3. Arabization ( ) 4. others ( )

If you have chosen *others*, could you please tell me what were they?

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8. Diagnosis: Hypermetropia with **astigmatism**

What kind of strategy have you employed in translating the above term?

1. Translation ( ) 2. Transliteration ( ) 3. Arabization ( ) 4. others ( )

If you have chosen *others*, could you please tell me what were they?

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9. Diagnosis: Neurogenic **cystoplegia** with spasm and urinary tract infection.

What kind of strategy have you employed in translating the above term?

1. Translation ( ) 2. Transliteration ( ) 3. Arabization ( ) 4. others ( )

If you have chosen *others*, could you please tell me what were they?

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10. Drug resistance is also evident in diarrhoeal diseases, **hospital-acquired infections**, malaria, meningitis, respiratory tract infections, and sexually transmitted infections, and is emerging in HIV.

What kind of strategy have you employed in translating the above term?

1. Translation ( ) 2. Transliteration ( ) 3. Arabization ( ) 4. others ( )

If you have chosen *others*, could you please tell me what were they?

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11. Drug resistance is also evident in diarrhoeal diseases, hospital-acquired infections, **malaria**, meningitis, respiratory tract infections, and sexually transmitted infections, and is emerging in HIV.

What kind of strategy have you employed in translating the above term?

1. Translation ( ) 2. Transliteration ( ) 3. Arabization ( ) 4. others ( )

If you have chosen *others*, could you please tell me what were they?

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12. Drug resistance is also evident in diarrhoeal diseases, hospital-acquired infections, malaria, meningitis, respiratory tract infections, and sexually transmitted infections, and is emerging in **HIV**.

What kind of strategy have you employed in translating the above term?

1. Translation ( ) 2. Transliteration ( ) 3. Arabization ( ) 4. others ( )

If you have chosen *others*, could you please tell me what were they?

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13. Drug resistance is also evident in diarrhoeal diseases, hospital-acquired infections, malaria, **meningitis**, respiratory tract infections, and sexually transmitted infections, and is emerging in HIV.

What kind of strategy have you employed in translating the above term?

1. Translation ( ) 2. Transliteration ( ) 3. Arabization ( ) 4. others ( )

If you have chosen *others*, could you please tell me what were they?

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14. Emerging viral diseases such as **Ebola**, Marburg haemorrhagic fever and Nipah virus pose threats to global public health security.

What kind of strategy have you employed in translating the above term?

1. Translation ( ) 2. Transliteration ( ) 3. Arabization ( ) 4. others ( )

If you have chosen *others*, could you please tell me what were they?

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15. Emerging viral diseases such as Ebola, Marburg haemorrhagic fever and **Nipah virus** pose threats to global public health security.

What kind of strategy have you employed in translating the above term?

1. Translation ( ) 2. Transliteration ( ) 3. Arabization ( ) 4. others ( )

If you have chosen *others*, could you please tell me what were they?

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16. He is on regular follow up in the **Pediatric Hematology Department**

What kind of strategy have you employed in translating the above term?

1. Translation ( ) 2. Transliteration ( ) 3. Arabization ( ) 4. others ( )

If you have chosen *others*, could you please tell me what were they?

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17. Health professionals including **neurologists**, and physiotherapy, occupational therapy and speech therapy were involved.

What kind of strategy have you employed in translating the above term?

1. Translation ( ) 2. Transliteration ( ) 3. Arabization ( ) 4. others ( )

If you have chosen *others*, could you please tell me what were they?

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18. Health professionals including neurologists , and **physiotherapy**, occupational therapy and speech therapy were involved.

What kind of strategy have you employed in translating the above term?

1. Translation ( ) 2. Transliteration ( ) 3. Arabization ( ) 4. others ( )

If you have chosen *others*, could you please tell me what were they?

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19. Health professionals including neurology, and physiotherapy, **occupational therapy** and speech therapy were involved.

What kind of strategy have you employed in translating the above term?

1. Translation ( ) 2. Transliteration ( ) 3. Arabization ( ) 4. others ( )

If you have chosen *others*, could you please tell me what were they?

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20. **Immunisation**- the safest way to protect your health.

What kind of strategy have you employed in translating the above term?

1. Translation ( ) 2. Transliteration ( ) 3. Arabization ( ) 4. others ( )

If you have chosen *others*, could you please tell me what were they?

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21. In recent years, the most serious outbreak of **plague** occurred in five states in India in 1994.

What kind of strategy have you employed in translating the above term?

1. Translation ( ) 2. Transliteration ( ) 3. Arabization ( ) 4. others ( )

If you have chosen *others*, could you please tell me what were they?

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22. It would be extremely naive and complacent to assume that there will not be another disease like **AIDS**.

What kind of strategy have you employed in translating the above term?

1. Translation ( ) 2. Transliteration ( ) 3. Arabization ( ) 4. others ( )

If you have chosen *others*, could you please tell me what were they?

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23. Japan and the United States have 5–8 times more magnetic resonance imaging **(MRI)** units per million inhabitants than Canada and the Netherlands.

What kind of strategy have you employed in translating the above term?

1. Translation ( ) 2. Transliteration ( ) 3. Arabization ( ) 4. others ( )

If you have chosen *others*, could you please tell me what were they?

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24. Manchester Sickle Cell and **Thalassaemia** Centre

What kind of strategy have you employed in translating the above term?

1. Translation ( ) 2. Transliteration ( ) 3. Arabization ( ) 4. others ( )

If you have chosen *others*, could you please tell me what were they?

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25. Problem: Concerns regarding **aspiration**

What kind of strategy have you employed in translating the above term?

1. Translation ( ) 2. Transliteration ( ) 3. Arabization ( ) 4. others ( )

If you have chosen *others*, could you please tell me what were they?

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26. Problem: **Demyelinating neuropathy**

What kind of strategy have you employed in translating the above term?

1. Translation ( ) 2. Transliteration ( ) 3. Arabization ( ) 4. others ( )

If you have chosen *others*, could you please tell me what were they?

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27. **Retinopathy** Screening Service

What kind of strategy have you employed in translating the above term?

1. Translation ( ) 2. Transliteration ( ) 3. Arabization ( ) 4. others ( )

If you have chosen *others*, could you please tell me what were they?

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28. **SARS** and avian influenza in humans have triggered major international concern.

What kind of strategy have you employed in translating the above term?

1. Translation ( ) 2. Transliteration ( ) 3. Arabization ( ) 4. others ( )

If you have chosen *others*, could you please tell me what were they?

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29. **Smallpox** is one of the oldest known human diseases.

What kind of strategy have you employed in translating the above term?

1. Translation ( ) 2. Transliteration ( ) 3. Arabization ( ) 4. others ( )

If you have chosen *others*, could you please tell me what were they?

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30. The **anthrax** attack had huge economic, public health and security consequences.

What kind of strategy have you employed in translating the above term?

1. Translation ( ) 2. Transliteration ( ) 3. Arabization ( ) 4. others ( )

If you have chosen *others*, could you please tell me what were they?

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31. The **catheter** should stay clamped except during voiding and must be changed every four weeks.

What kind of strategy have you employed in translating the above term?

1. Translation ( ) 2. Transliteration ( ) 3. Arabization ( ) 4. others ( )

If you have chosen *others*, could you please tell me what were they?

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32. The child last attended the **Orthoptic Clinic** on 7th Dec 2009.

What kind of strategy have you employed in translating the above term?

1. Translation ( ) 2. Transliteration ( ) 3. Arabization ( ) 4. others ( )

If you have chosen *others*, could you please tell me what were they?

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33. The child to see a consultant **paediatrician.**

What kind of strategy have you employed in translating the above term?

1. Translation ( ) 2. Transliteration ( ) 3. Arabization ( ) 4. others ( )

If you have chosen *others*, could you please tell me what were they?

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34. The current situation is a wake-up call to all countries especially those in Arica, to ensure that basic **tuberculosis** control reaches international standards.

What kind of strategy have you employed in translating the above term?

1. Translation ( ) 2. Transliteration ( ) 3. Arabization ( ) 4. others ( )

If you have chosen *others*, could you please tell me what were they?

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35. The emergence of new foodborne diseases creates considerable concern, such as the recognition of the new variant of Creutzfeldt-Jakob diseases associated with **bovine spongiform encephalopathy.**

What kind of strategy have you employed in translating the above term?

1. Translation ( ) 2. Transliteration ( ) 3. Arabization ( ) 4. others ( )

If you have chosen *others*, could you please tell me what were they?

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36. The **flu jab** is free and available between September and early November.

What kind of strategy have you employed in translating the above term?

1. Translation ( ) 2. Transliteration ( ) 3. Arabization ( ) 4. others ( )

If you have chosen *others*, could you please tell me what were they?

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37. The patient has a **neuropathy**.

What kind of strategy have you employed in translating the above term?

1. Translation ( ) 2. Transliteration ( ) 3. Arabization ( ) 4. others ( )

If you have chosen *others*, could you please tell me what were they?

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38. The patient had a **videofluoroscopy** examination to further assess her feeding and swallowing skills.

What kind of strategy have you employed in translating the above term?

1. Translation ( ) 2. Transliteration ( ) 3. Arabization ( ) 4. others ( )

If you have chosen *others*, could you please tell me what were they?

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39. The patient has recently undergone surgery for a gastrostomy and **fundoplication** at the General Hospital.

What kind of strategy have you employed in translating the above term?

1. Translation ( ) 2. Transliteration ( ) 3. Arabization ( ) 4. others ( )

If you have chosen *others*, could you please tell me what were they?

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40. The patient has recently undergone surgery for a **gastrostomy** and fundoplication at the General Hospital.

What kind of strategy have you employed in translating the above term?

1. Translation ( ) 2. Transliteration ( ) 3. Arabization ( ) 4. others ( )

If you have chosen *others*, could you please tell me what were they?

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41. The patient is a known case of **haemophilia B**.

What kind of strategy have you employed in translating the above term?

1. Translation ( ) 2. Transliteration ( ) 3. Arabization ( ) 4. others ( )

If you have chosen *others*, could you please tell me what were they?

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42. The patient is waiting for **immunology assessment**.

What kind of strategy have you employed in translating the above term?

1. Translation ( ) 2. Transliteration ( ) 3. Arabization ( ) 4. others ( )

If you have chosen *others*, could you please tell me what were they?

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43. The patient was referred to the consultant paediatric **ophthalmologist** at the eye hospital.

What kind of strategy have you employed in translating the above term?

1. Translation ( ) 2. Transliteration ( ) 3. Arabization ( ) 4. others ( )

If you have chosen *others*, could you please tell me what were they?

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44. The result was that within the next 20 years, many important vector- borne diseases including **African trypanosomiasis**, dengue and dengue haemorrhagic fever, and malaria emerged in new areas or re-emerged in areas previously affected.

What kind of strategy have you employed in translating the above term?

1. Translation ( ) 2. Transliteration ( ) 3. Arabization ( ) 4. others ( )

If you have chosen *others*, could you please tell me what were they?

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45. This person has been tested for the major **haemoglobinopathies**.

What kind of strategy have you employed in translating the above term?

1. Translation ( ) 2. Transliteration ( ) 3. Arabization ( ) 4. others ( )

If you have chosen *others*, could you please tell me what were they?

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What kind of strategy have you employed in translating the above terms?

1. Translation ( ) 2. Transliteration ( ) 3. Arabization ( ) 4. others ( )

If you have chosen *others*, could you please tell me what were they?

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• Did you use English- Arabic medical dictionary to translate the above medical terms? Yes ( ) No ( )

• If yes, was it useful? Yes ( ) No ( )

• Did you use Computer-Assisted translation (CAT) tools or any electronic tools to help you translate the above medical terms? Yes ( ) No ( )

• If yes, was it useful? Yes ( ) No ( )

Thanks for your time and your cooperation.